ZOONOSES MONITORING

AUSTRIA

The Report referred to in Article 9 of Directive 2003/99/EC

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

including information on foodborne outbreaks and antimicrobial resistance in zoonotic agents

IN 2005

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Austria**

Reporting Year: **2005**

Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
National Reference Laboratory for EHEC (VTEC) and Listeria, Department of Hygiene, Microbiology and Social Medicine, Division of Hygiene & Medical Microbiology	Innsbruck Medical University	Data concerning VTEC and listerisosis in humans
Competence Centre Infectious Diseases Epidemiology (CC-INFE)	Austrian Agency for Health and Food Safety, AGES	Compilation, validation, data entry and submission of the Trend Report
National Reference Laboratory for Campylobacter, Institute of Hygiene	Karl-Franzens-University, Graz	Data concerning campylobacteriosis in humans
National Reference Laboratory for Yersinia Institute for Medical Microbiology and Hygiene (IMED), Linz	Austrian Agency for Health and Food Safety, AGES	Data concerning yersiniosis in humans

Official Food Control Laboratories (ILMU)	Austrian Agency for Health and Food Safety, AGES; Laboratories in Graz, Innsbruck, Linz, Salzburg and Vienna	Data concerning investigations in foodstuffs
National Reference Laboratory for Trichinellosis in Animals, Institute for Veterinary Disease Control, (IVET), Innsbruck	Austrian Agency for Health and Food Safety, AGES	Data concerning trichinellosis in animals
Institute of Parasitology and Zoology, Department for Pathobiology	University of Veterinary Medicine Vienna	Data concerning Echinococcus in foxes
Central Veterinary Services	Federal Ministry of Health and Women	Data concerning notifiable zoonoses in animals; Revision of the draft of the Trend Report; Approval of the Trend Report for Submission
Food Office	Federal Ministry of Health and Women	Revision of the draft of the Trend Report
Carinthian Institute for Food Analysis and Quality Control	Regional Food Laboratory	Data concerning investigations in foodstuffs
Austrian Health Poultry Service	Association installed by law, running different programs e.g. salmonella control and hygiene programs, Control of veterinarians and poultry farmers	Data concerning the Austrian poultry industry
Institute for Agricultural Analysis, Linz	Austrian Agency for Health and Food Safety, AGES	Data concerning feeding stuff
Institute for Biostatistics	Austrian Agency for Health and Food Safety, AGES	Analysis of antimicrobial resistance of Campylobacter spp. and E. coli isolated from animals
DG Public Health	Federal Ministry of Health and Women	Revision of the draft of the Trend Report

Provincial Veterinary Services	9 provinces, one Veterinary Service per province	Data concerning notifiable zoonoses in animals
Regional Health Boards	One Regional Health Board per province	Collection of data of food borne outbreaks
Statistics Austria	Federal Statistics is the Federal Government's non-personal information system, which provides data on the economy, demography, environment and social and cultural situation in Austria to federal bodies to assist them with planning, laying the groundwork for decisions and controlling measures implemented, and also to the scientific community, business and the public.	Demographic and livestock census data
National Reference Laboratory for Brucellosis, Institute for Veterinary Disease Control, (IVET), Moedling	Austrian Agency for Health and Food Safety, AGES	Data concerning brucellosis in animals and humans
National Reference Laboratory for Salmonella Institute for Medical Microbiology and Hygiene, (IMED), Graz	Austrian Agency for Health and Food Safety, AGES	Data concerning salmonellosis in feedingstuff, animals, foodstuff and humans

National Reference Laboratory for Toxoplasmosis, Echinococcoses, Toxocarosis and other Parasitic Diseases, Clinical Institute for Hygiene and Medical Microbiology	Medical University of Vienna	Data concerning parasitic diseases in humans
National Reference Laboratory for Tuberculosis, Institute for Medical Microbiology and Hygiene (IMED), Vienna	Austrian Agency for Health and Food Safety, AGES	Data concerning mycobacteriosis in humans
Food Safety Department of the City of Vienna	Regional Food Laboratory	Data concerning investigations in foodstuffs
Institute for Food Investigation of the State Vorarlberg	Regional Food Laboratory	Data concerning investigations in foodstuffs
Carinthian Institute for Veterinary Disease Control, Ehrental	Regional Veterinary Laboratory	Data concerning investigations in animals
National Reference Laboratory for Tuberculosis in Animals, Institute for Veterinary Disease Control, Moedling	Austrian Agency for Health and Food Safety, AGES	Data concerning tuberculosis in animals

National Reference Laboratory for Rabies, Institute for Veterinary Disease Control, Moedling	Austrian Agency for Health and Food Safety, AGES	Data concerning rabies
Institutes for Veterinary Disease Control (IVET)	Austrian Agency for Health and Food Safety, AGES; Laboratories in Graz, Innsbruck, Linz and Moedling	Data concerning investigations in animals; bacteriological investigation in slaughtered animals

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/EC[1]. 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 Austria during the year 2005. The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal 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 Community 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 Community 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 Community Summary Report on zoonoses that is published each year by EFSA.

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[1] 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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1. ANIMAL POPULATIONS

The relevance of the findings on zoonoses and zoonotic agents has to be related to the size and nature of the animal population in the country.

A. Information on susceptible animal population

Sources of information:

The Statistics Austria is the Federal Government's non-personal information system, which provides data on the economy, demography, environment and social and cultural situation in Austria to federal bodies to assist them with planning, laying the groundwork for decisions and controlling measures implemented, and also to the scientific community, business and the public.

Dates the figures relate to and the content of the figures:

Data relates to 2005, except some information on livestock numbers in poultry and horses, which is from 2003.

Table Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Livestock numbers (live animals)	Year*	Number of slaughtered animals	Year*	Number of herds or flocks	Year*	Number of holdings	Year*
Cattle (bovine animals)	dairy cows and heifers	881175		256517					
	meat production animals (1)	230614		309181					
	calves (under 1 year) (2)	628426		88540					
	in total (3)	2010680		565698				82906	
Ducks	in total	82705	2003						
Gallus gallus (fowl)	broilers	5828735	2003						
	in total	12354358	2003	63537006	2005			70725	2003
Geese	in total	19548	2003						
Goats	in total	55100		50564				10242	
Pigs	fattening pigs	1224053		5227590					
	in total	3169541		5324184				54356	
Sheep	in total	325728		295061				16112	
Solipeds, domestic	horses - in total	87072	2003	1029	2005			17566	2003
Turkeys	in total	550071	2003	2081925	2005				
unspecified	sows and gilts			96594					

(1): Livestock numbers: female & male; Number of slaughtered animals: only male
(2): CATTLE under 1 year, column 'slaughtered animals' only calves
(3): without calves

2. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

Zoonoses are diseases or infections, which are naturally transmissible directly or indirectly between animals and humans. Foodstuffs serve often as vehicles of zoonotic infections. Zoonotic agents cover viruses, bacteria, fungi, parasites or other biological entities that are likely to cause zoonoses.

2.1. SALMONELLOSIS

2.1.1. General evaluation of the national situation

A. General evaluation

History of the disease and/or infection in the country

Human salmonellosis still poses a major problem for human health.

National evaluation of the recent situation, the trends and sources of infection

The incidence of human salmonellosis has significantly declined since the peak in 1998/1999. The salmonella-contamination of poultry meat has declined from more than 33% to less than 10%. Consumption eggs are presently the major source of human infection.
The number of salmonellosis cases presented in this report reflects the number of primary human isolates and respectively the number of laboratory confirmed cases sent to the National Reference Laboratory for Salmonella. And this number exceeds the number of cases officially notified. Hence for the first time in 2005 the number of primary human isolates of Salmonella spp. (n = 5615) dropped behind the the number of laboratory primary isolates of Campylobacter spp (n = 6249).Compared with the official notifications according to the preliminary official data of the Federal Ministry for Health and Women (vorläufiger Jahresausweis über angezeigte Fälle übertragbarer Krankheiten, Stand vom 27. Jänner 2006) salmonellosis (n = 5164) is still the most important cause for enteric diseases in Austria (campylobacteriosis: 5065 cases).

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

In feedingstuffs the prevalence of salmonella (<1%) is still decreasing. Salmonella is only of minor relevance in Austrian cattle and pigs. Poultry is considered the main source for human infection. Although only few eggs were positive for salmonella (approx. 0.1 - 1%), infected eggs pose the main source of human infections.

Recent actions taken to control the zoonoses

There were various programs implemented to improve the situation in poultry, concerning meat and egg production. The main effort is directed onto sanitation of breeding flocks.

Suggestions to the Community for the actions to be taken

Continue the efforts already started, especially efforts for harmonization of the various national monitoring and control programs along the food chain.

Additional information

Nil

2.1.2. Salmonella in foodstuffs

A. Salmonella spp. in eggs and egg products

Monitoring system

Frequency of the sampling

Eggs at egg packing centres (foodstuff based approach)

Other:

B. Salmonella spp. in food - All foodstuffs - Monitoring - official sampling

Monitoring system

Sampling strategy

No surveillance programmes are applied.
Foodstuff was sampled according to the Erlass der Bundesministerin für Gesundheit und Frauen: Revisions- und Probenplan für das Jahr 2004; Richtlinien über die Vollziehung der Überwachung des Verkehrs mit den durch das LMG 1975 erfassten Waren (GZ BMGF-75500/0087--IV/B/10/2004 of 23.12.2004). The Revision-Plan determines the number of food enterprises e.g. restaurants, dairies, retail etc. that have to be tested randomly per province according to the number of food enterprises per province. Each business has to be sampled at least once per year. The inspection can comprise sampling, hygienic investigations of the employees, checking of HACCP, control of manufacturing processes etc.
The sampling plan determines the number of samples of each class of goods, as raw meat, fresh or frozen; sausages; cheeses; milk; preserved food etc. that have to be investigated randomly. Samples from suspected foodstuffs are taken following outbreak investigation, complaint, confiscation, violation etc.

Diagnostic/analytical methods used

According to ISO 6579: 1999, with modifications: After preenrichment, selective enrichment in modified semisolid Rappaport-Vassiliadis or Diasalm, 18-24 hours at 42°C. Subsequently plating on XLD agar, Brilliant green-Phenolred-Lactose-Saccharose agar (BPLS), Salmonella Detection and Identification Medium (SMID) or Rambach agar.
25 g of raw material for egg products or 25 g of pooled content of 5 table eggs are either incubated directly or preenriched in peptone water. Further steps are performed as described above.
All isolates are sent to the NRL Salmonella and serotyped according to the Kauffmann-White- Scheme. All S. Enteritidis and S. Typhimurium isolates are phage-typed according to the methods used by HPA, Colindale, UK.

National evaluation of the recent situation, the trends and sources of infection

Salmonella spp. could be detected in fresh or raw meat samples, intended to be eaten raw or cooked in 11.7 % single broiler meat samples (145 out of 1236), 11.3 % single turkey meat

samples (16/142), 1.2 % single pig meat samples (4/343), 0 % single bovine meat samples (0/68) and in 1.2 % single mixed minced meat samples (2/162). In single samples from cooked meat, ready-to-eat, Salmonella spp. could only be found in samples from broiler meat, in 11.1 % (23/207).

4257 samples from milk, milk products and cheeses were tested for Salmonella spp. Only from two samples (1 ice cream and 1 cheese made from pasteurized cow milk) Salmonella spp. could be isolated.

753 sample units containing 25 g of table eggs sampled at packing centre or at retail level were examined, in 12 samples (1.6 %) Salmonella spp. was detected, 7 times S. Enteritidis, 4 S. Agona and 1 S. Infantis.

Table Salmonella in poultry meat and products thereof (Part A)

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Montevideo	S. Agona	S. Hadar	S. Heidelberg	S. Indiana	S. Infantis	S. Kottbus	S. Newport	S. Saintpaul	S. Virchow	S. Mbandaka	S. Bredeney	S. Corvallis	S. Senftenberg	S. Ohio
Meat from broilers (Gallus gallus)																				
fresh (1)	1)	single	25g	1015	134	1	8	4	2	6	20	3	2	9	1	1	7		1	2
minced meat																				
intended to be eaten cooked	1)	single	25g	10	0															
meat preparation																				
intended to be eaten cooked	1)	single	25g	36	0															
meat products																				
raw but intended to be eaten cooked	1)	single	25g	175	11		2		1									1		
cooked, ready-to-eat	1)	single	25g	207	23	1	2	1			1			4			2			
Meat from turkey																				
fresh (2)	1)	single	25g	109	12						2	2	1	6			1			
meat preparation																				

intended to be eaten cooked	I)	single	25g	17	2									2						
meat products																				
raw but intended to be eaten cooked	I)	single	25g	16	2									2						
cooked, ready-to-eat	I)	single	25g	15	0															
Meat from duck	I)	single	25g	7	2					1										
Meat from geese	I)	single	25g	6	2						1									
Meat from other poultry species																				
meat products	I)	single	25g	3	1															

(1) : 2 serotypes isolated out of one sample
(2) : 2 serotypes isolated out of one sample

Footnote

I) all 5 AGES Institutes + LUA Vorarlberg + LUA Carinthia + MA 38

Table Salmonella in poultry meat and products thereof (Part B)

	S. Worthington	S. Kentucky	S. Blockley	Other serotypes	S. Thompson	S. group B	S. group C1	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from broilers (Gallus gallus)										
fresh (1)	14	2	1	1	3	2		36	8	1
minced meat										
intended to be eaten cooked										
meat preparation										
intended to be eaten cooked										
meat products										
raw but intended to be eaten cooked	2				1			4		
cooked, ready-to-eat	3							8	1	
Meat from turkey										
fresh (2)			1							
meat preparation										
intended to be eaten cooked										
meat products										

raw but intended to be eaten cooked										
cooked, ready-to-eat										
Meat from duck							1			
Meat from geese									1	
Meat from other poultry species										
meat products			1							

(1) : 2 serotypes isolated out of one sample
(2) : 2 serotypes isolated out of one sample

Footnote

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Table Salmonella spp. in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Saintpaul
Milk, cows'									
raw	I)	single	25g	11	0				
intended for direct human consumption	I)	single	25g	21	0				
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products	I)	single	25g	11	0				
intended for manufacture of pasteurised/UHT products	I)	single	25g	19	0				
pasteurised milk	I)	single	25g	336	0				
Milk, goats'									
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products	I)	single	25g	1	0				
pasteurised	I)	single	25g	2	0				
Milk, sheep's									
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products	I)	single	25g	1	0				
Cheeses made from cows' milk	I)	single	25g	57	0				
soft and semi-soft	I)	single	25g	65	0				
made from raw or low heat-treated milk	I)	single	25g	91	0				
made from pasteurized milk	I)	single	25g	649	1				1
Cheeses made from goats' milk	I)	single	25g	565	0				
soft and semi-soft	I)	single	25g	4	0				
made from raw or low heat-treated milk	I)	single	25g	18	0				

made from pasteurized milk	I)	single	25g	45	0				
Cheeses made from sheep's milk	I)	single	25g	1	0				
soft and semi-soft	I)	single	25g	3	0				
made from raw or low heat-treated milk	I)	single	25g	9	0				
made from pasteurized milk	I)	single	25g	55	0				
Dairy products (excluding cheeses)	I)	single	25g	734	0				
butter									
made from raw or low heat-treated milk	I)	single	25g	65	0				
cream									
made from raw or low heat-treated milk	I)	single	25g	58	0				
milk powder and whey powder	I)	single	25g	13	0				
ice-cream	I)	single	50g	1357	1	1			
dairy products, not specified									
made from pasteurized milk	I)	single	25g	66	0				
Fish	I)	single	25g	10	0				

Footnote

I) all 5 AGES Institutes + LUA Vorarlberg + LUA Carinthia + MA 38

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Worthington	S. Hadar	S. Saintpaul
Meat from pig											
fresh	I)	single	25g	98	1						1
minced meat											
intended to be eaten cooked	I)	single	25g	185	2				1		1
meat preparation											
intended to be eaten raw	I)	single	25g	8	0						
intended to be eaten cooked	I)	single	25g	17	1	1					
meat products											
raw but intended to be eaten cooked	I)	single	25g	35	0						
cooked, ready-to-eat	I)	single	25g	72	0						
Meat from bovine animals											
fresh	I)	single	25g	21	0						
minced meat											
intended to be eaten raw	I)	single	25g	2	0						
intended to be eaten cooked	I)	single	25g	39	0						
meat preparation											
intended to be eaten cooked	I)	single	25g	6	0						
meat products											
cooked, ready-to-eat	I)	single	25g	6	0						
Meat from sheep											
fresh	I)	single	25g	3	0						
minced meat	I)	single	25g	1	0						
Other products of animal origin											
gelatin and collagen	I)	single	25g	1	0						
Meat from deer (venison)											
fresh	I)	single	25g	2	0						
Meat, mixed meat	I)	single	25g	59	0						

minced meat	I)	single	25g	162	2					1	1
meat products											
fermented sausages	I)	single	25g	24	0						
cooked, ready-to-eat	I)	single	25g	21	0						

Footnote

I) all AGES Institutes + LUA Vorarlberg + LUA Carinthia + MA 38

Table Salmonella spp. in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. group B	S. Infantis	S. Senftenberg	S. Agona
Eggs												
table eggs												
- at packing centre	1)	single	25g	280	8	3				1		4
- at retail	1)	single	25g	473	4	4						
raw material (liquid egg) for egg products	1)	single	25g	60	7	7						
Egg products	1)	single	25g	274	3	3						
Fishery products	1)	single	25g	84	0							
Crustaceans	1)	single	25g	2	0							
unspecified												
cooked	1)	single	25g	6	0							
raw	1)	single	25g	10	0							
Molluscan shellfish	1)	single	25g	1	0							
cooked	1)	single	25g	9	0							
raw	1)	single	25g	8	0							
Fruits and vegetables												

precut	1)	single	25g	15	0														
ready-to-eat	1)	single	25g	127	0														
Juice																			
fruit juice																			
unpasteurised	1)	single	25g	17	0														
vegetable juice																			
unpasteurised	1)	single	25g	5	0														
Infant formula																			
dried																			
intended for infants below 6 months	1)	single	25g	17	0														
Foodstuffs intended for special nutritional uses																			
dried dietary foods for special medical purposes intended for infants below 6 months	1)	single	25g	11	0														
ready-to-eat	1)	single	25g	256	0														
Spices and herbs	1)	single	25g	129	4				4										
Bakery products																			
bread	1)	single	25g	104	0														
cakes	1)	single	25g	91	1									1					
Vegetables	1)	single	25g	157	0														
Confectionery products and pastes	1)	single	25g	27	0														
Other processed food products and prepared dishes																			
noodles	1)	single	25g	12	0														
unspecified																			
ready-to-eat foods	1)	single	25g	50	0														

containing raw egg	I)	single	25g	177	3	3						
non-ready-to-eat foods	I)	single	25g	21	0							
Coconut												
coconut products (1)	I)	single	25g	20	3						3	1
Sauce and dressings	I)	single	25g	66	0							
Other food	I)	single	25g	14	0							

(1) : 2 serotypes isolated out of one sample

Footnote

I) all 5 AGES Institutes + LUA Vorarlberg + LUA Carinthia + MA 38

2.1.3. Salmonella in animals

A. Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens

Monitoring system

Sampling strategy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There are only parent flocks existing in Austria. Permanent monitoring by a national program takes place at hatchery; each flock is tested regularly as well by the farmer as by the Veterinary Authority.
If S. Enteritidis, S. Typhimurium , S. Pullorum Gallinarum and S. Arizonae is isolated from breeding flocks at the hatchery the flock is banned and a sample of 20 birds at random from within the incriminated flock has to be taken. Inner organs as ovaries, liver and intestinal content are investigated.
If a parent flock is positive for other salmonellas Official Veterinarians take pooled feces samples from the incriminated flock. After a second positive result for Salmonella spp., within a period of two weeks organs from a minimum of 20 chickens were tested.

Laying hens flocks

Earliest 3 weeks prior to slaughter cloacal swabs have to be taken. Other programs are not foreseen, only voluntary sampling by the farmer or sampling according to private cooperatives is performed.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Other: There were no separate elite and grand parent flocks in Austria, only parent flocks! Every flock is tested at day one

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Other: There were no separate elite and grand parent flocks in Austria, only parent flocks! 1. Routinely: Every flocks is tested at the age of 4 and 12 weeks and 2 weeks before the laying period starts. 2. Confirmation: If Salmonella was isolates from day old chicks.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Other: There were no separate elite and grand parent flocks in Austria, only

parent flocks! Monitoring by national program, takes place at hatchery, each flock is tested every two weeks at hatch by the farmer, and every 6 weeks by the Veterinary Authority; additional each flock is tested every 4 weeks by the farmer by boot swabs.

Laying hens: Day-old chicks

Other: no legal requirements, e.g. at day one each flock

Laying hens: Rearing period

Other: no legal requirements, e.g. 2 times at week 12 and 2 weeks before the laying period start

Laying hens: Production period

Other: no legal requirements, according to the program of the cooperatives (e.g. every three month, every eight weeks)

Laying hens: Before slaughter at farm

Other: 3 weeks before slaughter at farm

Laying hens: At slaughter

Other: no sampling

Eggs at packing centre (flock based approach)

Other: According to the program of the cooperatives voluntary surface swabs (e.g. every eight weeks)

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Other: There were no separate elite and grand parent flocks in Austria, only parent flocks! Visibly soiled hatcher basket liners, dead chicks if available

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Other: There were no separate elite and grand parent flocks in Austria, only parent flocks! Routine testing: drag swabs, pooled feces. For confirmation: organs as ovaries, liver and intestinal content from a minimum of 20 chickens.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Other: There were no separate elite and grand parent flocks in Austria, only parent flocks! Routine testing: Drag swabs, pooled feces, dust in the hatchery,

meconium, broken eggshells, hatched eggs. For confirmation: Inner organs as ovaries, liver and intestinal content from a minimum of 20 chickens. Inner organs of 5 chickens or intestinal content of 5 chickens were pooled.

Laying hens: Day-old chicks

Other: no legal requirements, e.g. visibly soiled hatcher basket liners

Laying hens: Rearing period

Other: no legal requirements, e.g. pooled feces

Laying hens: Production period

Other: no legal requirements, e.g. pooled feces or drag swabs

Laying hens: Before slaughter at farm

Other: 9 cloacal swabs per flock

Laying hens: At slaughter

Other: no sampling

Eggs at packing centre (flock based approach)

Other: Voluntary e.g. surface swabs

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

There were no separate elite and grand parent flocks in Austria, only parent flocks! Routine testing: 60 pooled droppings a 1gram per flock, collection of dust. For confirmation: Diagnostically killing of 20 random chickens from within the incriminated flock

Breeding flocks: Production period

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Routine testing: 1 drag swab, pooled feces, collection of dust. For confirmation: Diagnostically killing of 20 random chickens from within the incriminated flock

Laying hens: Day-old chicks

No legal requirements, e.g. visibly soiled hatcher basket liners

Laying hens: Rearing period

No legal requirements, e.g. 60 pooled droppings a 1 gram per flock

Laying hens: Production period

No legal requirements, e.g. 60 pooled droppings a 1 gram per flock or 1 drag swab

Laying hens: Before slaughter at farm

9 cloacal swabs

Laying hens: At slaughter

No sampling

Eggs at packing centre (flock based approach)

No legal requirements, e.g. surface swabs

Case definition

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Routine testing: Salmonella spp. isolated from hatcher basket liners

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Salmonella spp. isolated from inner organs or from content of intestines of chickens killed for diagnosis

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Salmonella spp. isolated from inner organs or from content of intestines of chicken

Laying hens: Day-old chicks

no legal requirements, e.g. Salmonella spp. isolated from hatcher basket liners

Laying hens: Rearing period

no legal requirements

Laying hens: Production period

no legal requirements

Laying hens: Before slaughter at farm

Salmonella spp. isolated from cloacal swabs

Laying hens: At slaughter

no sampling

Eggs at packing centre (flock based approach)

Salmonella spp. isolated from surface swabs

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Other: There were no separate elite and grand parent flocks in Austria, only parent flocks! Sample material is incubated in liquid medium. Modification of ISO 6579 (2002), where a semi solid medium (MSRV) is used as the single selective enrichment medium. The semi solid medium is incubated at 41.5+/- 1°C for 24 or 48 hours. All isolates are sent to the NRL Salmonella and serotyped according to the Kauffmann-White-Scheme. All S. Enteritidis and S. Typhimurium isolates are phage-typed according to the methods used by HPA, Colindale, UK.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Other: See day old chicks

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Other: See day old chicks

Laying hens: Day-old chicks

Other: Sample material is incubated in liquid medium. Modification of ISO 6579 (2002), where a semi solid medium (MSRV) is used as the single selective enrichment medium. The semi solid medium is incubated at 41.5+/- 1°C for 24 or 48 hours. All isolates are sent to the NRL Salmonella and serotyped according to the Kauffmann-White-Scheme. All S. Enteritidis and S. Typhimurium isolates are phage-typed according to the methods used by HPA, Colindale, UK.

Laying hens: Rearing period

Other: See laying hens, day old chicks.

Laying hens: Production period

Other: See laying hens, day old chicks.

Laying hens: Before slaughter at farm

Other: See laying hens, day old chicks.

Laying hens: At slaughter

Other: no testing

Eggs at packing centre (flock based approach)

Other: See laying hens, day old chicks.

Vaccination policy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There were no separate elite and grand parent flocks in Austria, only parent flocks! The national program for parent flocks made vaccination against Salmonella mandatory for all flocks

Laying hens flocks

The national program recommended vaccination against S. Enteritidis

Other preventive measures than vaccination in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Nil

Laying hens flocks

Nil

Control program/mechanisms

The control program/strategies in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There were no separate elite and grand parent flocks in Austria, only parent flocks! The Austrian control program is conducted according to the National Poultry Hygiene Regulation (BGBl 243/2000, Gefluegelhygieneverordnung 2000 of 28 July 2000). The Austrian program for monitoring and eradication of Salmonella in breeding flocks of poultry was again (already since 2000) approved for the year 2004 by Commission Decision 2003/849/EG of 28 November 2003.

Laying hens flocks

The Austrian control program is conducted according to the National Poultry Hygiene Regulation (BGBl 243/2000, Gefluegelhygieneverordnung 2000 of 28 July 2000).

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Measures according to the National Poultry Hygiene Regulation:
- ; Banning of the incriminated sector of the holding
- ; Culling of the infected flock
- ; Disposal of the hatched eggs
- ; Abolishing of the restriction after cleaning and disinfection
- ; If necessary prescriptions of GMP to prevent re-infection

Laying hens flocks

Flocks were either treated with antimicrobials or competitive exclusion and a hygiene plan is performed. Slaughtering was only permitted for Salmonella negative flocks.

Notification system in place

All positive findings in parent flocks had to be notified to the local authority and via the Austrian Poultry Health Service to the Federal Ministry of Health and Women.

National evaluation of the recent situation, the trends and sources of infection

In 2004, Salmonella Enteritidis was identified in one parent flock and three thereof descending laying flocks. After confirmation the parent flock was culled, the laying flocks voluntarily killed.

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

In 2005 more than 83% out of 5615 human infections were caused by S. Enteritidis.

B. Salmonella spp. in Gallus gallus - breeding flocks for meat production and broiler flocks

Monitoring system

Sampling strategy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There are only parent flocks existing in Austria. Permanent monitoring by a national program takes place at hatchery; each flock is tested regularly as well by the farmer as by the Veterinary Authority. If S. Enteritidis, S. Typhimurium , S. Pullorum Gallinarum and S. Arizonae is isolated from breeding flocks at the hatchery the flock is banned and a sample of 20 birds at random from within the incriminated flock has to be taken. Inner organs as ovaries, liver and intestinal content are investigated.
If a parent flock is positive for other salmonellas Official Veterinarians take pooled faeces samples from the incriminated flock. After a second positive result for Salmonella spp., within a period of two weeks organs from a minimum of 20 chickens were tested.

Broiler flocks

Earliest 3 weeks prior to slaughter cloacal swabs have to be taken. Other programs are not foreseen, only voluntary sampling by the farmer or sampling according to private cooperatives is performed.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Other: Other: There were no separate elite and grand parent flocks in Austria, only parent flocks!

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Other: Other: There were no separate elite and grand parent flocks in Austria, only parent flocks!

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Other: Other: There were no separate elite and grand parent flocks in Austria, only parent flocks!

Broiler flocks: Day-old chicks

Other: Other: no legal requirements, e.g. at day one each flock

Broiler flocks: Rearing period

Other: Other: no legal requirements

Broiler flocks: Before slaughter at farm

Other: Other: 3 weeks before slaughter at farm

Broiler flocks: At slaughter (flock based approach)

Other: Other: No sampling

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Other: Other: There were no separate elite and grand parent flocks in Austria, only parent flocks!

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Other: Other: There were no separate elite and grand parent flocks in Austria, only parent flocks!

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Other: Other: There were no separate elite and grand parent flocks in Austria, only parent flocks!content from a minimum of 20 chickens. Inner organs of 5 chickens or intestinal content of 5 chickens were pooled.

Broiler flocks: Day-old chicks

Other: Other: no legal requirements, e.g. visibly soiled hatcher basket liners

Broiler flocks: Rearing period

Other: Other: no legal requirements, e.g. pooled feces

Broiler flocks: Before slaughter at farm

Other: Other: 9 cloacal swabs per flock

Broiler flocks: At slaughter (flock based approach)

Other: Other: No sampling

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Visibly soiled hatcher basket liners, dead chicks if available

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

(27)
Routine testing: 60 pooled droppings a 1gram per flock, collection of dust. For confirmation: Diagnostically killing of 20 random chickens from within the incriminated flock.

Breeding flocks: Production period

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Routine testing: 1 drag swab, pooled feces, collection of dust For confirmation: Diagnostically killing of 20 random chickens from within the incriminated flock

Broiler flocks: Day-old chicks

No legal requirements, e.g. visibly soiled hatcher basket liners

Broiler flocks: Rearing period

No legal requirements, e.g. 60 pooled droppings a 1gram per flock

Broiler flocks: Before slaughter at farm

9 cloacal swabs

Broiler flocks: At slaughter (flock based approach)

No sampling

Case definition

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Routine testing: Salmonella spp. isolated from hatcher basket liners and dead chicks if available

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Salmonella spp. isolated from inner organs or from content of intestines of chickens killed
for diagnosis.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Salmonella spp. isolated from inner organs or from content of intestines of chicken

Broiler flocks: Day-old chicks

No legal requirements

Broiler flocks: Rearing period

No legal requirements

Broiler flocks: Before slaughter at farm

Salmonella spp. isolated from cloacal swabs

Broiler flocks: At slaughter (flock based approach)

No sampling

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Other: Other: There were no separate elite and grand parent flocks in Austria, only parent flocks!

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Other: Other: See day-old chicks

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Other: Other: See day-old chicks

Broiler flocks: Day-old chicks

Other: Other: See day-old chicks

Broiler flocks: Rearing period

Other: Other: See day-old chicks

Broiler flocks: Before slaughter at farm

Other: Other: See day-old chicks

Broiler flocks: At slaughter (flock based approach)

Other: Other: no testing

Vaccination policy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There were no separate elite and grand parent flocks in Austria, only parent flocks! The national program for parent flocks made vaccination against Salmonella mandatory for all flocks

Broiler flocks

Neither legal requirements nor recommendations

Other preventive measures than vaccination in place

Broiler flocks

Nil

Control program/mechanisms

The control program/strategies in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There were no separate elite and grand parent flocks in Austria, only parent flocks! The Austrian control program is conducted according to the National Poultry Hygiene Regulation (BGBl 243/2000, Geflügelhygieneverordnung 2000 of 28 July 2000). The Austrian program for monitoring and eradication of Salmonella in breeding flocks of poultry was again (already since 2000) approved for the year 2004 by Commission Decision 2003/849/EG of 28 November 2003.

Broiler flocks

The Austrian control program is conducted according to the National Poultry Hygiene
Regulation (BGBl 243/2000, Geflügelhygieneverordnung 2000 of 28 July

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

There were no separate elite and grand parent flocks in Austria, only parent flocks!
Measures according to the National Poultry Hygiene Regulation:
- ; Banning of the incriminated sector of the holding
- ; Culling of the infected flock
- ; Disposal of the hatched eggs
- ; Abolishing of the restriction after cleaning and disinfection
- ; If necessary prescriptions of GMP to prevent re-infection

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

See day-old chicks.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

See day-old chicks.

Broiler flocks: Day-old chicks

Flocks were treated either with antimicrobials or competitive exclusion strategies takes place.

Broiler flocks: Rearing period

Flocks were treated either with antimicrobials or competitive exclusion strategies takes place.

Broiler flocks: Before slaughter at farm

Flocks were treated either with antimicrobials or competitive exclusion strategies takes place. Slaughtering was only permitted for Salmonella spp. negative flocks.

Broiler flocks: At slaughter (flock based approach)

No testing

Notification system in place

All positive findings in parent flocks had to be notified to the local authority and via the Austrian Poultry Health Service to the Federal Ministry of Health and Women.

National evaluation of the recent situation, the trends and sources of infection

Slaughtering was only permitted for Salmonella negative flocks.

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

Slaughtering was only permitted for Salmonella negative flocks.

C. Salmonella spp. in turkey - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

There were no breeding flocks in Austria

Meat production flocks

Earliest 3 weeks prior to slaughter cloacal swabs have to be taken. Other programs are not foreseen, only voluntary sampling by the farmer or sampling according to private cooperatives is performed.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Other:

Meat production flocks: Day-old chicks

Other: Other: no legal requirements, e.g. at day one each flock

Meat production flocks: Rearing period

Other: Other: 3 weeks before slaughter at farm

Meat production flocks: At slaughter (flock based approach)

Other: Other: No sampling

Type of specimen taken

Meat production flocks: Day-old chicks

Other: Other: no legal requirements, e.g. visibly soiled hatcher basket liners

Meat production flocks: Rearing period

Other: Other: no legal requirements, e.g. pooled feces

Meat production flocks: Before slaughter at farm

Other: Other: 9 cloacal swabs per flock

Meat production flocks: At slaughter (flock based approach)

Other: Other: no sampling

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

No breeding flocks in Austria.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

No breeding flocks in Austria.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

No breeding flocks in Austria.

Meat production flocks: Day-old chicks

No sampling

Meat production flocks: Rearing period

No legal requirements

Meat production flocks: Before slaughter at farm

9 cloacal swabs

Meat production flocks: At slaughter (flock based approach)

no sampling

Case definition

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

No flocks in Austria

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

No flocks in Austria

Meat production flocks: Day-old chicks

No legal requirements

Meat production flocks: Rearing period

No legal requirements

Meat production flocks: Before slaughter at farm

Salmonella spp. isolated from cloacal swabs

Meat production flocks: At slaughter (flock based approach)

No sampling

Diagnostic/analytical methods used

Meat production flocks: Day-old chicks

Other: Other: Sample material is incubated in liquid medium. Modification of ISO 6579 (2002), where a semi solid medium (MSRV) is used as the single selective enrichment medium. The semi solid medium is incubated at 41.5+/-1°C for 24 or 48 hours.

Meat production flocks: Rearing period

Other: Other: see day-old chicks

Meat production flocks: Before slaughter at farm

Other: Other: see day-old chicks

Meat production flocks: At slaughter (flock based approach)

Other: Other: see day-old chicks

Vaccination policy

Meat production flocks

Neither legal requirements nor recommendations

Other preventive measures than vaccination in place

Meat production flocks

Nil

Control program/mechanisms

The control program/strategies in place

Meat production flocks

The Austrian control program is conducted according to the National Poultry Hygiene Regulation (BGBl 243/2000, Geflügelhygieneverordnung 2000 of 28 July 2000).

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

Flocks were treated with antimicrobials. Slaughtering was only permitted for Salmonella negative flocks.

Notification system in place

Notification not mandatory

National evaluation of the recent situation, the trends and sources of infection

Slaughtering was only permitted for Salmonella negative flocks.

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

Slaughtering was only permitted for Salmonella negative flocks.

D. Salmonella spp. in animal

Monitoring system

Sampling strategy

1. Feces from animals suffering from diarrhea that were sent to a veterinary laboratory are examined for salmonellosis
2. After findings of enteritis in course of pathological examinations of deceased animals intestinal content is tested for Salmonella.
3. After slaughtering in course of the ante- and post mortem inspection act, all animals that are objected to bacteriological examination are tested for salmonella.

Frequency of the sampling

Animals at farm

Other: Other: Samples sent to a bacteriological laboratory are examined.

Animals at slaughter (herd based approach)

Other: Other: NO HERD BASED APPROACH! After emergency slaughtering or targeted when a carcass seems not to be fit for consumption.

Type of specimen taken

Animals at farm

Other: Other: Feces or intestinal content

Animals at slaughter (herd based approach)

Other: Other: NO HERD BASED APPROACH! 2 parts from muscles, 2 lymph nodes, parts of lever, spleen and kidney and if present pathological alterationsOther: NO HERD BASED APPROACH! 2 parts from muscles, 2

lymph nodes, parts of lever, spleen and kidney and if present pathological alterations

Methods of sampling (description of sampling techniques)

Animals at farm

No special methods

Animals at slaughter (herd based approach)

Samples were wrapped in sterile plastic bags. After cooling down to 4°C the samples were sent in a polystyrene box after adding cooling units to the locally appropriate Institute of Veterinary Diseases Control.

Case definition

Animals at farm

Salmonella spp. isolated from the sample

Animals at slaughter (herd based approach)

NO HERD BASED APPROACH! Salmonella spp. isolated from the sample

Diagnostic/analytical methods used

Animals at farm

Other: Other: Sample material is incubated in liquid medium. Modification of ISO 6579 (2002), where a semi solid medium (MSRV) is used as the single selective enrichment medium. The semi solid medium is incubated at 41.5+/-1°C for 24 or 48 hours.All isolates are sent to the NRL Salmonella and serotyped according to the Kauffmann-White-Scheme. All S. Enteritidis and S. Typhimurium isolates are phage-typed according to the methods used by HPA, Colindale, UK.

Animals at slaughter (herd based approach)

Other: Other: see animals at farm.

Vaccination policy

No vaccination

Other preventive measures than vaccination in place

None

Control program/mechanisms

The control program/strategies in place

No control programs in place

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for monitoring programs would be highly welcome.

Measures in case of the positive findings or single cases

1. and 2. No measures
3. According to BGBl 1982/522, Fleischuntersuchungsverordnung, as amended and BGBl 1994/395, Fleischuntersuchungsverordnung, as amended: The carcass is unfit for human consumption and must be removed. In all slaughtered animals descending from the same holding a post-mortem bacteriological examination has to be initiated.

Notification system in place

1. and 2. Notification not mandatory
3. According to BGBl 1994/395, §10 (8), Fleischuntersuchungsverordnung, as amended: The competent authority has to notify to the finding to the local authority.

National evaluation of the recent situation, the trends and sources of infection

Meats from animals play a minor role as source of infection for salmonellosis in humans

Table Salmonella in breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
parent breeding flocks for egg production line	I)	flock	18	0			
during rearing period	I)	flock	4	0			
during production period	I)	flock	14	0			
parent breeding flocks for meat production line	I)	flock	71	0			
during rearing period	I)	flock	25	0			
during production period	I)	flock	46	2	2		

Footnote

I) Austrian Health Poultry Service

Table Salmonella in other poultry (Part A)

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Agona	S. Jerusalem	S. Mbandaka	S. Rissen	S. Kentucky	S. Bredeney	S. Cubana	S. Havana	S. Heidelberg	S. India	S. Tennessee	S. Livingstone	S. Kottbus
Gallus gallus (fowl)																				
laying hens																				
day-old chicks	I)	flock	337	2																
during rearing period	I)	flock	910	2	1	1														
during production period	I)	flock	3488	63	40	6			1						1					
sampling in the framework of the laying hen baseline study (1)	II)	flock	361	56	32	5		1		3	1		1	1				3		1
broilers																				
day-old chicks	I)	flock	1273	31	28	2														
during rearing period	II)	flock	4748	170	103	3		3		4		7	2				4		3	
Ducks																				
meat production flocks	I)	flock	46	4	1	3											6			1
Geese																				
meat production flocks	I)	flock	151	26		16														
Turkeys																				

meat production flocks	I)	flock	1092	69	1											4				

(1) : 2 different serotypes isolated out of 7 sampled flocks

Footnote

I) Austrian Flock Poultry Service II) AGES Institute for Veterinary Disease Control Graz

Table Salmonella in other poultry (Part B)

	S. IIIb61:k:1,5,7	S. Regent	S. Bere	S. Hadar	S. Saintpaul	S. Worthington	S. Blockley	S. Senftenberg	S. Montevideo	S. Infantis	S. Braenderup	S. Virchow	S. Thompson
Gallus gallus (fowl)													
laying hens													
day-old chicks					1			1					
during rearing period													
during production period			1	1	1			2	4	4	2		
sampling in the framework of the laying hen baseline study (1)	2							3	5	4	2		
broilers													
day-old chicks								1					
during rearing period				2		3	2	7	2			25	
Ducks													
meat production flocks													
Geese													
meat production flocks		1			1								1
Turkeys													
meat production flocks				1	40		1	4	18				

(1) : 2 different serotypes isolated out of 7 sampled flocks

Footnote

I) Austrian Flock Poultry Service II) AGES Institute for Veterinary Disease Control Graz

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Gallinarum	S. Saintpaul
Pigeons	IV)	Animal	158	3		3			
Pheasants	IV)	Animal	2	0					
Partridges	IV)	Animal	3	0					
Ostriches	IV)	Animal	24	0					
Falcons	IV)	Animal	1	0					
Parrots	IV)	Animal	6	0					
Swans	IV)	Animal	1	0					
Turkeys	IV)	Animal	209	0					
Gallus gallus (fowl)									
unspecified	IV)	Animal	99	12	10			1	1
Budgerigars	IV)	Animal	6	0					
Oscine birds	IV)	Animal	19	3		3			

Footnote

IV) Clinical examination of all AGES Institutes for Veterinary Disease Control and Carinthian Institute for Veterinary disease Control Ehrenthal

Table Salmonella in other animals (Part A)

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Virchow	S. Kentucky	S. Derby	S. Dublin	S. Kisarawe	S. Veneziana	S. Abony	S. Ferruch	S. enterica subsp. arizonae	S. Ealing	S. IV 44	S. IIIb 47	S. IIIb 61
Cattle (bovine animals)	IV)	Animal	913	3	3															
calves (under 1 year)	IV)	Animal	421	0																
adult cattle over 2 years	IV)	Animal	869	10	2	3		2	1	1										1
Sheep	IV)	Animal	132	1												1				
Goats	IV)	Animal	41	0																
Pigs	IV)	Animal	1008	0																
breeding animals	IV)	Animal	312	4	2	2														
fattening pigs	IV)	Animal	308	2	2															
Solipeds, domestic	IV)	Animal	19	0																
ponies	IV)	Animal	12	1		1														
Dogs	IV)	Animal	212	3	1	1					1									
Chinchillas	IV)	Animal	2	0																
Badgers	IV)	Animal	1	0																
Deer																				
wild																				
fallow deer	IV)	Animal	12	0																

red deer	IV)	Animal	1	0																
roe deer	IV)	Animal	16	0																
Cats	IV)	Animal	59	1	1															
Alpine chamois	IV)	Animal	1	0																
Guinea pigs	IV)	Animal	1	0																
Turtles	IV)	Animal	2	2										1	1					
Rabbits	IV)	Animal	17	0																
Reptiles																				
pet animals	IV)	Animal	2	2								1							1	
Snakes	IV)	Animal	16	7									1				1	1		
Lamas	IV)	Animal	1	0																
Mouflons	IV)	Animal	3	0																
Wild animals	IV)	Animal	10	1	1															
Birds	IV)	Animal	20	2		2														

Footnote

IV) All AGES Institutes for Veterinary Disease Control and Carinthian Institute for Veterinary Disease Control Ehrental

Table Salmonella in other animals (Part B)

	S. enterica subsp. diarizonae	S. IIIb 58:l,v:z35
Cattle (bovine animals)		
calves (under 1 year)		
adult cattle over 2 years		
Sheep		
Goats		
Pigs		
breeding animals		
fattening pigs		
Solipeds, domestic		
ponies		
Dogs		
Chinchillas		
Badgers		
Deer		
wild		
fallow deer		
red deer		

roe deer		
Cats		
Alpine chamois		
Guinea pigs		
Turtles		
Rabbits		
Reptiles		
pet animals		
Snakes	3	1
Lamas		
Mouflons		
Wild animals		
Birds		

Footnote

IV) All AGES Institutes for Veterinary Disease Control and Carinthian Institute for Veterinary Disease Control Ehrental

2.1.4. Salmonella in feedingstuffs

A. Salmonella spp. in feed - All feedingstuffs - in total - Monitoring - official sampling

Monitoring system

Sampling strategy

Sampling is as well random as targeted without regional criteria. The sampling is performed by competent authorities; the samples were taken on farms, slaughterhouses, processing plants, retailers. The sampling is part of the permanent monitoring.

Frequency of the sampling

Domestic feed material of plant origin

Other: Other: Sampling distributed evenly throughout the year, each farm, processing plant, and retailer is sampled at least two times per year. Control is conducted in the final product. Suspected batches are sampled.

Domestic feed material of animal origin

Other: as above

Imported feed material of plant origin

Other: as above

Imported feed material of animal origin

Other: as above

Process control in feed mills

Other: as above

Compound feedingstuffs

Other: as above

Type of specimen taken

Domestic feed material of plant origin

Oil seed meals and cakes

Domestic feed material of animal origin

Fish meal, dried animal by-products for pets

Imported feed material of plant origin

Oil seed meals and cakes

Imported feed material of animal origin

Fish meal, dried animal by-products for pets

Process control in feed mills

Not applicable (n. a.)

Compound feedingstuffs

Feed for poultry

Methods of sampling (description of sampling techniques)

Domestic feed material of plant origin

Sampling is performed according EC-Directive 76/371/EEC applying special hygiene requirements or sampling of original packaged products.

Domestic feed material of animal origin

As above

Imported feed material of plant origin

As above

Imported feed material of animal origin

As above

Process control in feed mills

As above

Compound feedingstuffs

As above

Definition of positive finding

Domestic feed material of plant origin

Salmonella spp. isolated from the sample

Domestic feed material of animal origin

Salmonella spp. isolated from the sample

Imported feed material of plant origin

Salmonella spp. isolated from the sample

Imported feed material of animal origin

Salmonella spp. isolated from the sample

Process control in feed mills

Salmonella spp. isolated from the sample

Compound feedingstuffs

Salmonella spp. isolated from the sample

Diagnostic/analytical methods used

Domestic feed material of plant origin

Bacteriological method: ISO 6579:2002

Domestic feed material of animal origin

Other: as above

Imported feed material of plant animal

Other: as above

Imported feed material of animal origin

Other: as above

Process control in feed mills

Other: as above

Compound feedingstuffs

Other: as above

Control program/mechanisms

The control program/strategies in place

National legislation: BGBl. Nr. 139/1999 (Futtermittelgesetz 1999, § 3) and BGBl. Nr. 93/2000 (Futtermittelverordnung 2000, as amended) containing general requirements for feedingstuffs and BGBl. II Nr. 243/2000 (Geflügelhygieneverordnung 2000).
EC: salmonella monitoring, general requirements for feed material and compound feed, coordinated annual control program

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings

Domestic feed material of plant origin

Notification of the positive findings and the confiscation and prescription of following official measures as withdrawal from the market, recall of feed, decontamination of the feed, disposal or other use of the feed, exploration and elimination of the sources of contamination and operational measures to prevent future contaminations.

Domestic feed material of animal origin

As above

Imported feed material of plant origin

As above

Imported feed material of animal origin

As above

Process control in feed mills

As above

Compound feedingstuffs

As above

Notification system in place

Notification to the local authority according the Rapid Alert System for Food and Feed (RASFF) that is in place since 1979. The legal basis of the RASFF is Regulation EC/178/2002.

National evaluation of the recent situation, the trends and sources of infection

In the last 20 years the situation in feed has improved due to increase of numbers of farms, processing plants and retailer using HACCP concepts, traceability of contaminated feed/components of feed, palletizing feed/contaminated feed.

Additional information

Nil

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of marine animal origin								
fish meal	*)	batch	25g	4	0			

Footnote

*) quality assurance program of companies AGES Institute for Agricultural Analysis Linz

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Agona	S. Infantis	S. Montevideo
Feed material of cereal grain origin											
barley derived (1)	*)	batch	25g	11	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	1	0						
wheat derived (2)	*)	batch	25g	6	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	1	0						
maize (3)	*)	batch	25g	4	0						
derived (13)	*)	batch	25g	5	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	1	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	1	0						
other cereal grain derived											
- Surveillance - HACCP or own checks by industry	**)	batch	50g	1	0						
Feed material of oil seed or fruit origin											
groundnut derived (4)	*)	batch	25g	1	0						
rape seed derived (5)	*)	batch	25g	227	13					1	12
- Surveillance - HACCP or own checks by industry	**)	batch	50g	14	1						1
soya (bean) derived (6)	*)	batch	25g	37	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	49	1				1		
sunflower seed derived (7)	*)	batch	25g	150	6						6
- Surveillance - HACCP or own checks by industry	**)	batch	50g	6	0						

linseed derived (8)	*)	batch	25g	4	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	8	1				1		
other oil seeds derived (9)	*)	batch	25g	5	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	1	0						
Other feed material											
legume seeds and similar products (10)	*)	batch	25g	4	0						
tubers, roots and similar products (11)	*)	batch	25g	14	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	2	0						
other plants (12)	*)	batch	25g	2	0						
- Surveillance - HACCP or own checks by industry	**)	batch	50g	1	0						

(1) : non-compulsory testing
(2) : non-compulsory testing
(3) : non-compulsory testing
(4) : non-compulsory testing
(5) : non-compulsory testing
(6) : non-compulsory testing
(7) : non-compulsory testing
(8) : non-compulsory testing
(9) : non-compulsory testing
(10) : non-compulsory testing
(11) : non-compulsory testing
(12) : non-compulsory testing
(13) : non-compulsory testing

Footnote

*) Quality assurance program of private companies AGES Institute for Agricultural Analysis Linz **) Compulsory monitoring program (Futtermittel-Gesetz 1999) AGES Institute for Agricultural Analysis Linz

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Senftenberg	S. Tennessee
Compound feedingstuffs for cattle										
process control (1)	*)	batch	25g	6	0					
final product	**)	batch	50g	2	0					
Compound feedingstuffs for pigs										
process control (2)	*)	batch	25g	7	1				1	
final product	**)	batch	50g	9	0					
Compound feedingstuffs for poultry (non specified)										
process control (3)	*)	batch	25g	50	0					
final product	**)	batch	50g	34	0					
Compound feedingstuffs for poultry -breeders										
process control (4)	*)	batch	25g	38	0					
final product	**)	batch	50g	23	0					
Compound feedingstuffs for poultry - laying hens										
process control (5)	*)	batch	25g	72	0					
final product	**)	batch	50g	142	0					
Compund feedingstuffs for poultry - broilers										
process control (6)	*)	batch	25g	94	1			1		1
final product	**)	batch	50g	50	0					
Compound feedingstuffs for sheep	**)	batch	50g	1	0					
Compound feedingstuffs for horses	**)	batch	50g	6	0					
Compound feedingstuffs for rabbits	**)	batch	50g	1	0					

(1) : non-compulsory testing
(2) : non-compulsory testing
(3) : non-compulsory testing
(4) : non-compulsory testing
(5) : non-compulsory testing
(6) : non-compulsory testing

Footnote

*) quality assurance program of private companies AGES Institute for Agricultural Analysis Linz **) Compulsory monitoring program (Futtermittel-Gesetz 1999) AGES Institute for Agricultural Analysis Linz

2.1.5. Salmonella serovars and phagetype distribution

Table Salmonella serovars in animals

Serovars		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Turkeys		Geese	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=		13		12		709				68		44
Number of isolates serotyped	N=		13		12		709				68		44
Number of isolates per type													
S. Abony							1				1		1
S. Agona							2						
S. Anatum							1						
S. Bere							1						
S. Blockley							2						
S. Braenderup							12						
S. Bredeney							19						
S. Cubana							1						
S. Derby					1								
S. Enteritidis			4		5		406						1
S. Hadar							11				1		
S. Havana							1						
S. Heidelberg							1				3		
S. Indiana							14				1		
S. Infantis					1		47						
S. Jerusalem							3						

S. Kentucky						5						
S. Kottbus						4						3
S. Liverpool						1						
S. Livingstone						4				1		
S. Mbandaka						23						
S. Montevideo						33				15		
S. Muenchen						4						
S. Ohio												1
S. Ouakam						3						
S. Regent						1						1
S. Rissen						2						
S. Saintpaul						4				38		1
S. Senftenberg						19				6		6
S. Tennessee						10						
S. Thompson						1						3
S. Typhimurium		3		5		48				1		26
S. Virchow		5				12						
S. Worthington						4						
S. IIIb 61:-:1,5,7		1				5						
S. Gallinarum						1						
S. group C1										1		
S. I, monophasic strain						3						
S. group E1, monophasic strain												1
Total of typed *Salmonella* isolates												

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella serovars in food

Serovars		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=		2		0		192				
Number of isolates serotyped	N=		2		0		192				
Number of isolates per type											
S. Agona							23				
S. Anatum							2				
S. Blockley							2				
S. Bredeney							3				
S. Derby			1								
S. Enteritidis							61				
S. Hadar							4				
S. Heidelberg							1				
S. Indiana							10				
S. Infantis							24				
S. Kentucky			1				3				
S. Mbandaka							1				
S. Montevideo							2				

S. Ohio						2				
S. Saintpaul						8				
S. Senftenberg						1				
S. Thompson						5				
S. Typhimurium						7				
S. Worthington						24				
S. group B						2				
S. I, monophasic strain						4				
S. group B, monophasic strain						2				
S. IV 43:z4,z24:-						1				
Total of typed *Salmonella* isolates										

Footnote

(*) M : Monitoring, C : Clinical

Table S. Enteritidis phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Turkeys		Geese	
Sources of isolates	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory N=		4		5		406				0		1
Number of isolates phagetyped N=		4		5		406				0		1
Number of isolates per type												
PT 1						25						
PT 4				1		109						1
PT 6						23						
PT 8		2		1		100						
PT 14b						4						
PT 21		2		1		49						
PT 1b				1								
PT 2						7						
PT 12						1						
PT 23						11						
PT 7				1		57						
19						5						
PT 5a						5						
PT 5c						1						
U						1						
RDNC						8						

Total of typed *Salmonella* isolates												

Footnote

(*) M : Monitoring, C : Clinical

Table S. Enteritidis phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=		0		0		61				
Number of isolates phagetyped	N=		0		0		61				
Number of isolates per type											
PT 1							7				
PT 4							11				
PT 6							6				
PT 8							10				
PT 21							16				
PT 13a							1				
PT 23							1				
PT 7							2				
19							1				
PT 34							1				
PT 9b							1				
PT 11							1				
PT 1c							1				

RDNC												2									
Total of typed *Salmonella* isolates																					

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Geese		Turkeys	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=		3		5		48				26		1
Number of isolates phagetyped	N=		3		5		48				26		1
Number of isolates per type													
DT 9							1						
DT 46			1				4				2		
DT 104l			1		1		3						1
DT 120					2								
DT 193							6				12		
DT 85							11				12		
DT 99							1						
DT 10							1						
DT 104H			1		1		9						
RDNC					1		12						
Total of typed *Salmonella* isolates													

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium Phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=		0		0		7				
Number of isolates phagetyped	N=		0		0		7				
Number of isolates per type											
DT 104l							2				
U 302							1				
DT 85							2				
RDNC							2				
Total of typed *Salmonella* isolates											

Footnote

(*) M : Monitoring, C : Clinical

2.1.6. Antimicrobial resistance in Salmonella isolates

The methods of collecting, isolating and testing of the Salmonella isolates are described in the chapters above respectively for each animal species, foodstuffs and humans. The serotype and phagetype distributions can be used to investigate the sources of the Salmonella infections in humans. Findings of same serovars and phagetypes in human cases and in foodstuffs or animals may indicate that the food category or animal species in question serves as a source of human infections. However as information is not available from all potential sources of infections, conclusions have to be drawn with caution.

A. Antimicrobial resistance of Salmonella spp. in animal

Sampling strategy used in monitoring

Frequency of the sampling

There is no monitoring program in Austria. All Salmonella spp. isolated in veterinary and food laboratories, as well as all primary isolates from humans were sent to NRL-S and susceptibility testing were performed using the disk diffusion method.

Type of specimen taken

Clinical samples from humans; for animals and food see chapters Salmonella spp. in animal species and Salmonella spp. in food.

Methods of sampling (description of sampling techniques)

Clinical samples from humans; for animals and food see chapters Salmonella spp. in animal species and Salmonella spp. in food.

Procedures for the selection of isolates for antimicrobial testing

All Salmonella spp. isolated in veterinary and food laboratories, as well as all primary isolates from humans were sent to NRL-S and susceptibility testing were performed using the disk diffusion method.

Methods used for collecting data

See chapter salmonellosis in humans

Laboratory methodology used for identification of the microbial isolates

National Reference Laboratory for Salmonella, AGES Graz

Laboratory used for detection for resistance

Antimicrobials included in monitoring

All Salmonella isolates were susceptibility tested (disc diffusion) according to NCCLS. See corresponding tables!

Control program/mechanisms

Recent actions taken to control the zoonoses

All Salmonella spp. isolates that were sent to the NRL-S were tested.

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for antimicrobial resistance monitoring would be highly welcome.

Additional information

Nil

B. Antimicrobial resistance of Salmonella spp. in animal - Gallus gallus (fowl) - laying hens - sampling in the framework of the laying hen baseline study

Sampling strategy used in monitoring

Frequency of the sampling

According to the technical specifications 362 holdings all over Austria had to be sampled, 209 holdings in the category 1,000 - 2,999, 76 in the category 3,000 - 4,999, 46 in the category 5,000 - 9,999, 25 in the category 10,000 - 29,999 and 6 in the category >= 30,000. Finally 361 holding were sampled in 8 of the 9 Austrian provinces, in the province of Vienna there was no holding with laying hens with more than 1,000 hens. 105 cage flocks, 78 barn flocks, 106 free range standard flocks and 72 free range organic flocks were tested.

Type of specimen taken

In cage flocks pooled faeces from dropping belts, scrapers or deep pits and dust from beneath the cages were sampled, in barn - and free range flocks "socks" and dust from barn or free range houses as well as dust from egg belts were collected.

Procedures for the selection of isolates for antimicrobial testing

Each isolated Salmonella spp. was tested for the antimicrobial susceptibility by the disk diffusion test. In each flock positive for Salmonella spp., each strain was tested in the microdilution test for the minimal inhibition concentrations, e.g. if S. Enteritidis PT4 was isolated from 3 different samples within one flock, the microdilution test was performed only once with this strain.

Laboratory methodology used for identification of the microbial isolates

The method given in the technical specifications was used.

Control program/mechanisms

Recent actions taken to control the zoonoses

The number of flocks of laying hens vaccinated against S. Enteritidis has been increasing during the last years. In 2005 approximately 50% of holdings with laying hens were vaccinated.

Table Antimicrobial susceptibility testing of S.Enteritidis in animals

n = Number of resistant isolates

	S. Enteritidis									
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**		**Geese**	
Isolates out of a monitoring programme	no		no		no		no		no	
Number of isolates available in the laboratory	4		5		406		0		1	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines										
Tetracyclin	4	0	5	0	406	2			1	0
Amphenicols										
Chloramphenicol	4	0	5	0	406	0			0	0
Cephalosporins										
Cefotaxim	4	0	5	0	406	0			1	0
Fluoroquinolones										
Ciprofloxacin	4	0	5	0	406	0			1	0
Quinolones										
Nalidixic acid	4	0	5	0	406	16			1	0
Trimethoprim	4	0	5	0	406	3			1	0
Sulfonamides										
Sulfonamide	4	0	5	0	406	5			1	0
Aminoglycosides										
Streptomycin	4	0	5	0	406	2			1	0
Gentamicin	4	0	5	0	406	0			1	0
Kanamycin	4	0	5	0	406	0			1	0
Penicillins										
Ampicillin	4	0	5	0	406	11			1	0
Fully sensitive	4	4	5	5	406	377			1	1
Resistant to 1 antimicrobial	4	0	5	0	406	23			1	0
Resistant to 2 antimicrobials	4	0	5	0	406	4			1	0
Resistant to 3 antimicrobials	4	0	5	0	406	1				

Table Antimicrobial susceptibility testing of S. Enteritidis - qualitative data

n = Number of resistant isolates

	S. Enteritidis							
	Meat from broilers (Gallus gallus)		**Meat from pig**		**Meat from bovine animals**		**Other food**	
Isolates out of a monitoring programme	no		no		no		no	
Number of isolates available in the laboratory	61		0		0		1	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Amphenicols								
Chloramphenicol	61	0					1	0
Cephalosporins								
Cefotaxim	61	0					1	0
Fluoroquinolones								
Ciprofloxacin	61	0					1	0
Quinolones								
Nalidixic acid	61	13					1	0
Trimethoprim	61	1					1	0
Sulfonamides								
Sulfonamide	61	0					1	0
Aminoglycosides								
Streptomycin	61	0					1	0
Gentamicin	61	0					1	0
Kanamycin	61	0					1	0
Penicillins								
Ampicillin	61	3					1	0
Tetracyclines								
Tetracyclin	61	0					1	0
Fully sensitive	61	46					1	1
Resistant to 1 antimicrobial	61	14						
Resistant to 3 antimicrobials	61	1						

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates

	S. Typhimurium									
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**		**Geese**	
Isolates out of a monitoring programme	no		no		yes		no		no	
Number of isolates available in the laboratory	3		5		48		1		26	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines										
Tetracyclin	3	1	5	3	48	3	1	1	26	0
Amphenicols										
Chloramphenicol	3	1	5	2	48	3	1	1	26	0
Cephalosporins										
Cefotaxim	3	0	5	0	48	0	1	0	26	0
Fluoroquinolones										
Ciprofloxacin	3	0	5	0	48	0	1	0	26	0
Quinolones										
Nalidixic acid	3	1	5	0	48	0	1	0	26	0
Trimethoprim	3	0	5	0	48	0	1	0	26	0
Sulfonamides										
Sulfonamide	3	1	5	3	48	3	1	1	26	0
Aminoglycosides										
Streptomycin	3	1	5	3	48	3	1	1	26	0
Gentamicin	3	0	5	0	48	1	1	0	26	0
Kanamycin	3	0	5	0	48	0	1	0	26	0
Penicillins										
Ampicillin	3	1	5	3	48	5	1	1	26	0
Fully sensitive	3	2	5	2	48	43	1	0	26	26
Resistant to 1 antimicrobial	3	0	5	0	48	2	1	0	26	0
Resistant to 2 antimicrobials	3	0	5	0	48	0	1	0	26	0
Resistant to 3 antimicrobials	3	0	5	0	48	0	1	0	26	0
Resistant to 4 antimicrobials	3	0	5	2	48	0	1	0	26	0
Resistant to >4 antimicrobials	3	1	5	1	48	3	1	1	26	0
Number of multiresistant S. Typhimurium DT104										
with penta resistance	1	1	1	1	3	3	1	1	0	0
resistant to other antimicrobials	1	0	1	0	3	0	1	0	0	0

Table Antimicrobial susceptibility testing of S. Typhimurium - qualitative data

n = Number of resistant isolates

	S. Typhimurium							
	Meat from broilers (Gallus gallus)		**Meat from pig**		**Meat from bovine animals**		**Other food**	
Isolates out of a monitoring programme	no		no		no		no	
Number of isolates available in the laboratory	7		0		0		14	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Amphenicols								
Chloramphenicol	7	2					14	0
Cephalosporins								
Cefotaxim	7	0					14	0
Fluoroquinolones								
Ciprofloxacin	7	0					14	0
Quinolones								
Nalidixic acid	7	1					14	0
Trimethoprim	7	0					14	0
Sulfonamides								
Sulfonamide	7	2					14	4
Aminoglycosides								
Streptomycin	7	2					14	5
Gentamicin	7	0					14	0
Kanamycin	7	0					14	0
Penicillins								
Ampicillin	7	3					14	5
Tetracyclines								
Tetracyclin	7	2					14	5
Fully sensitive	7	4					14	9
Resistant to 1 antimicrobial	7	1						
Resistant to 3 antimicrobials							14	1
Resistant to 4 antimicrobials							14	4
Resistant to >4 antimicrobials	7	2						

Table Antimicrobial susceptibility testing of Salmonella spp. in laying hens - Gallus gallus (fowl) - sampling in the framework of the laying hen baseline study - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	Salmonella spp.
	Gallus gallus (fowl) - laying hens - sampling in the framework of the laying hen baseline study
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	78

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	78	0							78												2	32
Amphenicols																						
Chloramphenicol	78	0							1	16	59	2									2	64
Florfenicol	78	0							4	54	20										2	64
Cephalosporins																						
Cephalothin	78	0							28	48	2										2	64
Ceftiofur	78	0					47	31													0,5	8
Fluoroquinolones																						
Ciprofloxacin	78	0	77	1																	0,03	4
Quinolones																						
Nalidixic acid	78	0									77	1									8	128
Trimethoprim	78	0								78											4	32
Sulfonamides																						
Sulfonamide	78	0												78							64	1024
Aminoglycosides																						
Streptomycin	78	0								50	21	7									4	64
Gentamicin	78	0						78													1	32
Neomycin	78	0							78												2	32
Apramycin	78	0								78											4	64
Spectinomycin	78	1										51	25	1	1						4	128
Penicillins																						
Amoxicillin/Clavulanic acid	78	0							77		1										2	32
Ampicillin	78	1						16	61				1								1	32
Polymyxins																						


64
4
78
0
78
Colistin

Table Antimicrobial susceptibility testing of Salmonella in animals

n = Number of resistant isolates

	Salmonella spp.											
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**		**Geese**		**Gallus gallus (fowl) - laying hens - sampling in the framework of the laying hen baseline study**	
Isolates out of a monitoring programme	no		no		no		no		no		yes	
Number of isolates available in the laboratory	13		12		709		68		44		78	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines												
Tetracyclin	13	6	12	4	709	31	68	8	44	2	78	0
Amphenicols												
Chloramphenicol	13	6	12	1	709	12	68	1	44	1	78	0
Florfenicol											78	0
Cephalosporins												
Cephalothin											78	0
Cefotaxim	13	0	12	0	709	0	68	0	44	0		
Ceftiofur											78	0
Fluoroquinolones												
Ciprofloxacin	13	0	12	0	709	0	68	0	44	0	78	0
Quinolones												
Nalidixic acid	13	6	12	0	709	44	68	1	44	5	78	0
Trimethoprim	13	5	12	0	709	5	68	2	44	1	78	0
Sulfonamides												
Sulfonamide	13	6	12	4	709	19	68	3	44	1	78	0
Aminoglycosides												
Streptomycin	13	6	12	4	709	29	68	5	44	1	78	0
Gentamicin	13	0	12	0	709	1	68	1	44	0	78	0
Neomycin											78	0
Kanamycin	13	0	12	0	709	2	68	2	44	0		
Apramycin											78	0
Spectinomycin											78	1
Penicillins												
Amoxicillin/Clavulanic acid											78	0
Ampicillin	13	1	12	3	709	41	68	5	44	1	78	1
Polymyxins												
Colistin											78	0
Fully sensitive	13	7	12	8	709	627	68	57	44	39	78	76
Resistant to 1 antimicrobial	13	0	12	0	709	36	68	5	44	3	78	2
Resistant to 2 antimicrobials	13	0	12	0	709	20	68	2	44		78	0
Resistant to 3 antimicrobials	13	0	12	12	709	2	68		44	1	78	0
Resistant to 4 antimicrobials	13	0	12	2	709	19	68	2	44		78	0

Resistant to >4 antimicrobials	13	6	12	1	709	5	68	2	44	1	78	0

Table Antimicrobial susceptibility testing of Salmonella spp. in food

n = Number of resistant isolates

	Salmonella spp.							
	Meat from broilers (Gallus gallus)		**Meat from other poultry species**		**Meat from pig**		**Meat from bovine animals**	
Isolates out of a monitoring programme	no				no		no	
Number of isolates available in the laboratory	192				0		2	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	192	36					2	1
Amphenicols								
Chloramphenicol	192	4					2	0
Cephalosporins								
Cefotaxim	192	0					2	0
Fluoroquinolones								
Ciprofloxacin	192	1					2	0
Quinolones								
Nalidixic acid	192	53					2	0
Trimethoprim	192	7					2	0
Sulfonamides								
Sulfonamide	192	28					2	0
Aminoglycosides								
Streptomycin	192	23					2	0
Gentamicin	192	0					2	0
Kanamycin	192	6					2	0
Penicillins								
Ampicillin	192	17					2	0
Fully sensitive	192	129					2	1
Resistant to 1 antimicrobial	192	21					2	1
Resistant to 2 antimicrobials	192	4						
Resistant to 3 antimicrobials	192	15						
Resistant to 4 antimicrobials	192	18						
Resistant to >4 antimicrobials	192	5						

Table Antimicrobial susceptibility testing of other serovars - qualitative data

n = Number of resistant isolates

	other serovars							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme								
Number of isolates available in the laboratory	6		2		255		67	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Amphenicols								
Chloramphenicol	6	5	2	0	255	9	67	0
Cephalosporins								
Cefotaxim	6	0	2	0	255	0	67	0
Fluoroquinolones								
Ciprofloxacin	6	0	2	0	255	0	67	0
Quinolones								
Nalidixic acid	6	5	2	0	255	28	67	1
Trimethoprim	6	5	2	0	255	2	67	2
Sulfonamides								
Sulfonamide	6	5	2	1	255	11	67	2
Aminoglycosides								
Streptomycin	6	5	2	1	255	24	67	4
Gentamicin	6	0	2	0	255	0	67	1
Kanamycin	6	0	2	0	255	2	67	2
Penicillins								
Ampicillin	6	1	2	0	255	25	67	4
Tetracyclines								
Tetracyclin	6	5	2	1	255	26	67	7
Fully sensitive	6	1	2	1	255	207	67	57
Resistant to 1 antimicrobial					255	11	67	5
Resistant to 2 antimicrobials					255	16	67	2
Resistant to 3 antimicrobials			2	1	255	1		
Resistant to 4 antimicrobials					255	19	67	2
Resistant to >4 antimicrobials	6	5			255	1	67	1

Footnote

non S. Enteritidis and non S. Typhimurium

Table Antimicrobial susceptibility testing of Other serotypes - qualitative data

n = Number of resistant isolates

	Other serotypes							
	Meat from broilers (Gallus gallus)		**Meat from other poultry species**		**Meat from pig**		**Meat from bovine animals**	
Isolates out of a monitoring programme								
Number of isolates available in the laboratory	124		78		0		2	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Amphenicols								
Chloramphenicol	124	2	78	4			2	0
Cephalosporins								
Cefotaxim	124	0	78	0			2	0
Fluoroquinolones								
Ciprofloxacin	124	1	78	0			2	0
Quinolones								
Nalidixic acid	124	39	78	23			2	0
Trimethoprim	124	6	78	6			2	0
Sulfonamides								
Sulfonamide	124	26	78	15			2	0
Aminoglycosides								
Streptomycin	124	21	78	18			2	0
Gentamicin	124	0	78	2			2	0
Kanamycin	124	6	78	7			2	0
Penicillins								
Ampicillin	124	11	78	24			2	0
Tetracyclines								
Tetracyclin	124	34	78	33			2	1
Fully sensitive	124	79	78	38			2	1
Resistant to 1 antimicrobial	124	6	78	5			2	1
Resistant to 2 antimicrobials	124	4	78	4				
Resistant to 3 antimicrobials	124	14	78	15				
Resistant to 4 antimicrobials	124	18	78	8				
Resistant to >4 antimicrobials	124	3	78	8				

Footnote

non S. Enteritidis and non S. Typhimurium

Table Breakpoints for antibiotic resistance testing of Salmonella in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin				8	2	32	30	19		14
Amphenicols										
Chloramphenicol				16	2	64	30	18		12
Florfenicol				16	2	64				
Cephalosporins										
Cephalothin				16	2	64				
Cefotaxim							30	23		14
Ceftiofur				4	0,5	8				
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin				2	0,03	4	5	21		15
Enrofloxacin										
Quinolones										
Nalidixic acid				16	8	128	30	19		13
Trimethoprim				8	4	32	5	16		10
Sulfonamides										
Sulfonamide				256	64	1024	300	17		12
Aminoglycosides										
Streptomycin				16	4	64	10	15		11
Gentamicin				8	1	32	10	15		12
Neomycin				8	2	32				
Kanamycin							30	18		13
Apramycin				8	4	64				
Spectinomycin				64	4	128				
Trimethoprim + sulfonamides										
Trimethoprim + Sulfonamide										
Penicillins										
Amoxicillin/Clavulanic acid				16	2	32				
Ampicillin				16	1	32	10	17		13
Polymyxins										
Colistin				8	4	64				

Table Breakpoints for antibiotic resistance testing of Salmonella in Food

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin				8	2	32	30	19		14
Amphenicols										
Chloramphenicol				16	2	64	30	18		12
Florfenicol				16	2	64				
Cephalosporins										
Cephalothin				16	2	64				
Cefotaxim							30	23		14
Ceftiofur				4	0,5	8				
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin				2	0,03	4	5	21		15
Enrofloxacin										
Quinolones										
Nalidixic acid				16	8	128	30	19		13
Trimethoprim				8	4	32	5	16		10
Sulfonamides										
Sulfonamide				256	64	1024	300	17		12
Aminoglycosides										
Streptomycin				16	4	64	10	15		11
Gentamicin				8	1	32	10	15		12
Neomycin				8	2	32				
Kanamycin							30	18		13
Apramycin				8	4	64				
Spectinomycin				64	4	128				
Trimethoprim + sulfonamides										
Trimethoprim + Sulfonamide										
Penicillins										
Amoxicillin/Clavulanic acid				16	2	32				
Ampicillin				16	1	32	10	17		13
Polymyxins										
Colistin				8	4	64				

Table Breakpoints for antibiotic resistance testing of Salmonella in Feedingstuff

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin				8	2	32	30	19		14
Amphenicols										
Chloramphenicol				16	2	64	30	18		12
Florfenicol				16	2	64				
Cephalosporins										
Cephalothin				16	2	64				
Cefotaxim							30	23		14
Ceftiofur				4	0,5	8				
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin				2	0,03	4	5	21		15
Enrofloxacin										
Quinolones										
Nalidixic acid				16	8	128	30	19		13
Trimethoprim				8	4	32	5	16		10
Sulfonamides										
Sulfonamide				256	64	1024	300	17		12
Aminoglycosides										
Streptomycin				16	4	64	10	15		11
Gentamicin				8	1	32	10	15		12
Neomycin				8	2	32				
Kanamycin							30	18		13
Apramycin				8	4	64				
Spectinomycin				64	4	128				
Trimethoprim + sulfonamides										
Trimethoprim + Sulfonamide										
Penicillins										
Amoxicillin/Clavula acid				16	2	32				
Ampicillin				16	1	32	10	17		13
Polymyxins										
Colistin				8	4	64				

2.2. CAMPYLOBACTERIOSIS

2.2.1. General evaluation of the national situation

A. Thermophilic Campylobacter General evaluation

History of the disease and/or infection in the country

Human campylobacteriosis is increasingly recognized as a major public health problem.

National evaluation of the recent situation, the trends and sources of infection

In the last decade, campylobacteriosis was steadily increasing, and in 2005 the number of laboratory primary isolates of Campylobacter spp. (n = 6249) for the first time exceeded the number of primary human isolates of Salmonella spp. (n =5615), see chapter salmonellosis.
In 2005, the number of notifications were on the decrease compared to the previous year, even though there was an increase of notifications in one province by 150,5% due to the implementation of the compulsory notification for laboratories in the mentioned province. The incidence for Austria is at 63.1 per 100,000 inhabitants and reached almost the same level as salmonellosis. 5 out of 9 Austrian provinces reported-for the first time-human campylobacteriosis as the most frequently diagnosed food borne illness, having a higher incidence than salmonellosis. The sources of infection are unclear; the few published outbreaks in Austria were due to contaminated cow's milk and due to chicken meat. Pets are considered to be another possible source.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Feedingsstuffs has no obvious relevance. Animals are heavily infected: broiler flocks up to 67%. More than 50% of chicken meat harbor campylobacter. Although the actual source of infection is unknown in most cases, chicken meat may account for approx. 40% of human illness.

Recent actions taken to control the zoonoses

An Austrian wide monitoring program on the trends of campylobacter prevalence and antimicrobial resistance of campylobacter in poultry, bovine animals and pigs was implemented for the second year according to the directive 2003/99/EC of the European Parliament and the Council of 17 November 2003 in the National Order GZ: BMGF-74600/0092--IV/B/8/05 (Überwachungsprogramme 2005 zu ausgewählten Zoonosen und Antibiotikaresistenzen). The sampling was carried out from 30 May to 2 December 2005 and follow up programs will be realized in the forthcoming years.

Suggestions to the Community for the actions to be taken

Continue to work for harmonization of monitoring programs

Additional information

Nil

2.2.2. Campylobacter in foodstuffs

A. thermophilic Campylobacter spp., unspecified in food - All foodstuffs - Monitoring - official sampling

Monitoring system

Sampling strategy

No surveillance programmes are applied.
Foodstuff was sampled according to the Erlass der Bundesministerin für Gesundheit und Frauen: Revisions- und Probenplan für das Jahr 2004; Richtlinien über die Vollziehung der Überwachung des Verkehrs mit den durch das LMG 1975 erfassten Waren (GZ BMGF-75500/0087--IV/B/10/2004 of 23.12.2004). The Revision-Plan determines the number of food enterprises e.g. restaurants, dairies, retail etc. that have to be tested randomly per province according to the number of food enterprises per province. Each business has to be sampled at least once per year. The inspection can comprise sampling, hygienic investigations of the employees, checking of HACCP, control of manufacturing processes etc.
The sampling plan determines the number of samples of each class of goods, as raw meat, fresh or frozen; sausages; cheeses; milk; preserved food etc. that have to be investigated randomly. Samples from suspected foodstuffs are taken following outbreak investigation, complaint, confiscation, violation etc.

Diagnostic/analytical methods used

Samples are cultured either according to ISO 10272: 1995 or preenriched in Bolton bouillon at 42°C for 48 hours and subsequent plated on CCDA- or modified CCDA agar at 42°C for 48 hours microaerophilic. Campylobacter-like colonies were identified serologically, observing their characteristic motility and morphology under the microscope and the production of catalase and oxidase. Not all isolates of Campylobacter spp. are differentiated.

National evaluation of the recent situation, the trends and sources of infection

389 single samples of poultry meat, fresh, raw or frozen were tested and in 9.3 % thermophilic Campylobacter was found.
In 1 out of 198 tested single pig meat samples and 1 out of 30 single bovine meat samples thermophilic Campylobacter could be detected.

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. coli	C. lari	C. jejuni	C. upsaliensis	thermophilic Campylobacter spp., unspecified	C. fetus
Meat from broilers (Gallus gallus)											
fresh	II)	single	25g	162	15			2		13	
(other sample)	III)	single	swab	13	3			2			1
(other sample size)	IV)	single	10g	25	5					5	
frozen	II)	single	25g	13	2					2	
minced meat											
intended to be eaten cooked	II)	single	25g	6	0						
meat preparation											
intended to be eaten cooked	II)	single	25g	17	0						
(other sample)	II)	single	10g	2	1					1	
meat products											
raw but intended to be eaten cooked	II)	single	25g	78	1						
cooked, ready-to-eat	II)	single	25g	29	0						
Meat from turkey											
fresh	II)	single	25g	35	7	1				6	
(other sample)	III)	single	swab	2	0						
(other sample size)	IV)	single	10g	1	0						
frozen	II)	single	25g	9	0						
minced meat											
intended to be eaten cooked	II)	single	25g	1	0						
meat preparation											

intended to be eaten cooked	II)	single	25g	4	0						
(other sample size)	IV)	single	10g	3	0						
meat products											
raw but intended to be eaten cooked	II)	single	25g	1	0						
cooked, ready-to-eat	II)	single	25g	2	0						
Meat from duck	III)	single	swab	1	1			1			
Meat from geese	III)	single	25g	2	0						
Other products of animal origin	II)	single	25g	16	2					2	
Meat from guinea fowl	III)	single	swab	1	0						
Meat from poultry, unspecified											
meat preparation											
intended to be eaten cooked	III)	single	swab	2	0						

Footnote

II) AGES ILMU Vienna, Graz, Innsbruck, Linz, MA 38 and LUA Carinthia III) ILMU Salzburg IV) LUA Vorarlberg

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. upsaliensis	C. lari	thermophilic Campylobacter spp., unspecified
Meat from pig										
fresh	V)	single	25g	89	1					
(other sample)	III)	single	swab	3	0					
minced meat										
intended to be eaten raw	V)	single	25g	1	0					
meat products	V)	single	25g	105	0					
Meat from bovine animals										
fresh	V)	single	25g	18	0					
(other sample)	III)	single	swab	3	1		1			
minced meat										
intended to be eaten raw	III)	single	swab	9	0					
Meat from other animal species or not specified	V)	single	25g	76	0					
Milk, cows'										
raw	V)	single	25g	10	0					
intended for direct human consumption	V)	single	25g	32	0					
raw milk for manufacture										
intended for manufacture of raw or low heat-treated products	V)	single	25g	23	0					
Milk, goats'										
raw milk for manufacture										
intended for manufacture of raw or low heat-treated products	V)	single	25g	4	0					
Live bivalve molluscs	V)	single	25g	2	0					

Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)										
minced meat	III)	single	swab	35	0					
Fish										
raw	V)	single	25g	37	0					
Egg products	V)	single	25g	4	0					
Eggs										
raw material (liquid egg) for egg products	V)	single	25g	4	1					
Dairy products (excluding cheeses)										
dairy products, not specified	V)	single	25g	23	0					
Cheeses made from cows' milk	V)	single	25g	10	0					
Other processed food products and prepared dishes										
ices and similar frozen desserts	III)	single	swab	6	0					
Sweets	III)	single	swab	1	0					
Other food	VI)	single	swab	61	0					

Footnote

V) AGES ILMU Vienna, Graz, Innsbruck, Linz, MA 38, LUA Carinthia and LUA Vorarlberg III) ILMU Salzburg

2.2.3. Campylobacter in animals

A. Campylobacter spp. in animal - Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling

Monitoring system

Sampling strategy

Monitoring program on the occurrence and trend of antimicrobial resistance in thermophilic Campylobacter based on the prevalence of campylobacter in slaughtered animals: At an estimated percentage of resistance in antimicrobials of 20% and a desired accuracy of 5.5% for a confidence level of 95%, 193 isolates of Campylobacter jejuni/coli from bovine animals were required.
To obtain this number of isolates, as sample size, 1,034 slaughtered bovine animals had to be tested, calculated on approximately 664.000 slaughtered bovine animals in 2003 in Austria, with an estimated prevalence of Campylobacter jejuni/coli of 19%, based on the results from the monitoring in 2004, and at a desired accuracy of 5% for a confidence level of 95%. The sampling had been stratified on the number of slaughtering by abattoirs all over Austria but not on time. The sampling was equally distributed over the period of the study.
In Austria, all 68 abattoirs in which more than 500 bovine animals were slaughtered in 2003 accounted for approximately 83% of the total annual bovine production. Sampling was performed in the 48 of the 68 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 20 samples were distributed over the 48 abattoirs.

Frequency of the sampling

Detection of annual prevalence of 19 % at a 5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005.

Methods of sampling (description of sampling techniques)

The sampling was performed by official veterinarians carrying out the post-mortem inspection. At time of evisceration a part of the colon was ligated and wrapped in a sterile plastic bag. After cooling down to 4°C the sample was sent in a hobbock or polystyrene box after adding cooling units to the locally appropriate Institute of Veterinary Diseases Control (IVET). In the laboratory some content of each colon was inoculated in selective bouillon suitable for Campylobacter jejuni/coli.

Case definition

A bovine animal is considered to be infected with thermophilic Campylobacter following isolation of Campylobacter jejuni or C. coli from its colon.

Diagnostic/analytical methods used

Approximately 1 gram of content of the colon was enriched in Preston bouillon in microaerophilic atmosphere for 24 hours at 42°C. Subsequently the preenrichment was plated on modified CCD agar (mCCDA) and incubated in microaerophilic atmosphere at 42±1°C for 48 hours. Campylobacter-like colonies were identified by observing their characteristic motility and morphology under the microscope and the production of catalase and oxidase.
For typing and differentiating of C. jejuni and C. coli isolates, hippurate reaction and indoxylacetate-hydrolysis was performed. All C. jejuni and C. coli isolates were frozen in proteose pepton solution containing 10% glycerol or thioglycolate-broth at -70°C.
For quality control Campylobacter jejuni ATCC 33560, Escherichia coli ATCC 25922 and internal control isolates of C. jejuni and C. coli.
Statistical analysis was performed with EpiInfo version 3.3.2.

Vaccination policy

Vaccination is not performed in Austria

Other preventive measures than vaccination in place

None

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

None

Suggestions to the Community for the actions to be taken

Emphasis should be placed on education of the people for a better care in kitchen hygiene

Measures in case of the positive findings or single cases

None

Notification system in place

C. jejuni and C. coli are not notifiable in bovine animals

National evaluation of the recent situation, the trends and sources of infection

In 2005, 17.9% (CI 15.6-20.4; 181 out of 1012 samples) of slaughtered animals were positive for thermophilic Campylobacter. There was no significant decrease in the prevalence compared to the previous year (18,6% in 2004). Compared to 61.4 % (CI 57.6-65.2) of poultry slaughter batches or 48.4% (CI 44.4-53.0) of slaughtered pig's positive for thermophilic Campylobacter, it seems that the risk for humans to get infected after consumption of beef or veal remains of less relevance.

B. Campylobacter spp. in animal - Pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling

Monitoring system

Sampling strategy

Monitoring program on the occurrence and trend of antimicrobial resistance in thermophilic Campylobacter based on the prevalence of campylobacter in slaughtered animals: At an estimated percentage of resistance in antimicrobials of 45% and a desired accuracy of 5.5% for a confidence level of 95%, 311 isolates of Campylobacter jejuni/coli from pigs were required.
To obtain this number of isolates, as sample size, 541 slaughtered pigs had to be tested, calculated on approximately 4,700,00 slaughtered pigs in 2003 in Austria, with an estimated prevalence of Campylobacter jejuni/coli of 57.5%, based on the results from the monitoring in 2004, and at a desired accuracy of 5% for a confidence level of 95%. The sampling had been stratified on the number of slaughtering by abattoirs all over Austria but not on time. The sampling was equally distributed over the period of the study.
In Austria, all 73 abattoirs in which more than 3,500 pigs were slaughtered in 2003 accounted for approximately 90% of the total annual pig production. Sampling was performed in 48 of the 73 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 25 samples were distributed over the 48 abattoirs.

Frequency of the sampling

Detection of annual prevalence of 57.5 % and at a 5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005.

Methods of sampling (description of sampling techniques)

The sampling was performed by official veterinarians carrying out the post-mortem inspection. At time of evisceration a part of the colon was ligated and wrapped in a sterile plastic bag. After cooling down to 4°C the sample was sent in a hobbock or polystyrene box after adding cooling units to the locally appropriate Institute of Veterinary Diseases Control (IVET). In the laboratory some content of each colon was plated on selective medium suitable for Campylobacter jejuni/coli.

Case definition

A pig is considered to be infected with thermophilic Campylobacter following isolation of Campylobacter jejuni or C. coli from its colon.

Diagnostic/analytical methods used

A loop full of content of the colon is plated on modified CCD agar (mCCDA) and incubated in microaerophilic atmosphere at 42±1°C for 48 hours. Campylobacter-like colonies were identified by observing their characteristic motility and morphology under

the microscope and the production of catalase and oxidase.
For typing and differentiating of C. jejuni and C. coli isolates, hippurate reaction and indoxylacetate-hydrolysis was performed. All C. jejuni and C. coli isolates were frozen in proteose pepton solution containing 10% glycerol or thioglycolat-broth at -70°C.
For quality control Campylobacter jejuni ATCC 33560, Escherichia coli ATCC 25922 and internal control isolates C. jejuni and C. coli.
Statistical analysis was performed with EpiInfo version 3.3.2.

Vaccination policy

Vaccination is not performed in Austria

Other preventive measures than vaccination in place

None

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

None

Suggestions to the Community for the actions to be taken

Emphasis should be placed on education of the people for a better care in kitchen hygiene.

Measures in case of the positive findings or single cases

None

Notification system in place

C. jejuni and C. coli are not notifiable in pigs

National evaluation of the recent situation, the trends and sources of infection

In 2005, 48.7% (CI 44.4 - 53.0; 259 out of 532) of the tested pigs were positive for thermophilic Campylobacter. There was a significant decrease in the prevalence compared to the previous year (57.5%; CI 53.8 - 61.1; in 2004).

C. Campylobacter spp. in animal - Poultry, unspecified - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling

Monitoring system

Sampling strategy

Monitoring program on the occurrence and trend of antimicrobial resistance in thermophilic Campylobacter based on the prevalence of campylobacter in slaughter batches: At an estimated percentage of resistance in antimicrobials of 35% and a desired accuracy of 4.5% for a confidence level of 95%, 424 isolates of Campylobacter jejuni/coli from poultry were required.
To obtain this number of isolates, as sample size, 654 slaughter batches of poultry had to be tested, calculated on approximately more than 10,000 slaughter batches of poultry in 2003 in Austria, with an estimated prevalence of Campylobacter jejuni/coli of 64.8%, based on the results from the monitoring in 2004, and at a desired accuracy of 5% for a confidence level of 95%. Caeca of 10 animals, as the secondary sample size, had to be collected. The secondary sample size gives the number of birds per batch to be sampled and had been computed on slaughter batches of more than 2000 broilers, an expected prevalence of 30% within the batch and a confidence level of 95%. The sampling had been stratified on the number of slaughter batches by slaughter plants all over Austria but not on time. The sampling was equally distributed over the period of the study.
Sampling was performed in the 8 poultry slaughter plants with slaughter batches consisting of >2000 animals in Austria in 2003. The 8 slaughter plants included in the monitoring program accounted for almost 100% of broilers and turkeys of the total production in Austria.

Frequency of the sampling

Rearing period: no program
Before slaughter at farm: no program
At slaughter: Detection of annual prevalence in slaughter batches of 64.8 % at a 5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005.

Methods of sampling (description of sampling techniques)

Rearing period: no program
Before slaughter at farm: no program
At slaughter: The sampling was performed by official veterinarians carrying out the post-mortem inspection. At time of evisceration the whole intestines of 10 animals were taken and wrapped in a sterile plastic bag. After cooling down to 4°C the sample was sent in a hobbock or polystyrene box after adding cooling units to the locally appropriate Institute of Veterinary Diseases Control (IVET). In the laboratory a caecum of each intestinal convolute was identified, some content of each caecum pooled and plated on selective medium suitable for Campylobacter jejuni/coli.

Case definition

At slaughter: A slaughter batch is considered to be infected with thermophilic Campylobacter following isolation of Campylobacter jejuni or C. coli from its colon.

Diagnostic/analytical methods used

At slaughter: The pooled samples were examined by direct inoculation on modified CCD agar (mCCDA) that was incubated in microaerophilic atmosphere at 42±1°C for 48

hours. Campylobacter-like colonies were identified by observing their characteristic motility and morphology under the microscope and the production of catalase and oxidase.
For typing and differentiating of C. jejuni and C. coli isolates, hippurate reaction and indoxylacetate-hydrolysis was performed. All C. jejuni and C. coli isolates were frozen in proteose peptone solution containing 10% glycerol or thioglycolat-broth at -70°C.
For quality control Campylobacter jejuni ATCC 33560, Escherichia coli ATCC 25922 and internal control isolates C. jejuni and C. coli were used.
Statistical analysis was performed with EpiInfo version 3.3.2.

Vaccination policy

Vaccination is not performed in Austria

Other preventive measures than vaccination in place

None

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

None

Suggestions to the Community for the actions to be taken

Emphasis should be placed on education of the people for a better care in kitchen hygiene.

Measures in case of the positive findings or single cases

None

Notification system in place

C. jejuni and C. coli are not notifiable in poultry

National evaluation of the recent situation, the trends and sources of infection

In 2005, 61.4% (CI 57.6-65.2; 403 out of 656) of the tested slaughter batches/flocks were positive for thermophilic Campylobacter. There was a decrease in the prevalence compared to the previous year (64.8% in 2004) but not significant. Due to the fact that poultry is the animal species with the highest prevalence of Campylobacter jejuni and coli, poultry meat seem to be the most risky food combined with mistakes in kitchen hygiene for acquiring an infection with C. jejuni/coli.

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for Campylobacter	C. jejuni	C. coli	C. lari	C. upsaliensis	thermophilic Campylobacter spp., unspecified
Cattle (bovine animals)									
dairy cows	V)	Animals	1012	181	156	25			
Pigs	V)	Animals	532	259	1	258			
Gallus gallus (fowl)									
broilers									
- at slaughterhouse	V)	flocks	656	403	218	185			

Footnote

V) All AGES Institutes for Veterinary Disease control in Graz, Innsbruck, Linz, Moedling

2.2.4. Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance of Campylobacter spp. in animal - Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling

Sampling strategy used in monitoring

Frequency of the sampling

Described in chapter: Thermophilic campylobacter in bovine animals

Type of specimen taken

Described in chapter: Thermophilic campylobacter in bovine animals

Methods of sampling (description of sampling techniques)

Described in chapter: Thermophilic campylobacter in bovine animals

Procedures for the selection of isolates for antimicrobial testing

All 156 isolates of Campylobacter jejuni and 25 isolates of C. coli obtained in the monitoring program were sent to the IMED in Graz where the antimicrobial susceptibility testing of all isolates of Campylobacter spp. were performed.

Laboratory methodology used for identification of the microbial isolates

Described in chapter: Thermophilic campylobacter in bovine animals.
The susceptibility testing was done with Sensititre® Microbiology Systems (MCS Diagnostics). The frozen Campylobacter jejuni/coli strains were subcultivated on Columbia agar (bioMerieux) and incubated 48 hours at 42°C in microaerophilic atmosphere. 3-5 colonies were suspended in physiological NaCl solution and adjusted to a McFarland of 0.5. 50 µl of the suspension were inoculated into 10 ml Mueller Hinton bouillon and incubated 48 hours at 37°C in microaerophilic atmosphere.
MIC values have been entered in a Microsoft® Excel datasheet.

Control program/mechanisms

The control program/strategies in place

Samples from food animals were monitored for antimicrobial residues according to a randomized sampling scheme (BMGF-74320/0003-IV/B/7/2005, Rückstandsuntersuchung-Durchführungserlass 2005).

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for antimicrobial resistance monitoring would be highly welcome.

Measures in case of the positive findings or single cases

Nil

Notification system in place

Nil

National evaluation of the recent situation, the trends and sources of infection

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

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

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

Additional information

Nil

B. Antimicrobial resistance of Campylobacter spp. in animal - Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling

Sampling strategy used in monitoring

Frequency of the sampling

Described in chapter: Thermophilic campylobacter in pigs

Type of specimen taken

Described in chapter: Thermophilic campylobacter in pigs

Methods of sampling (description of sampling techniques)

Described in chapter: Thermophilic campylobacter in pigs

Procedures for the selection of isolates for antimicrobial testing

The single isolates of Campylobacter jejuni and all 258 isolates of C. coli obtained in the monitoring program were sent to the IMED in Graz where the antimicrobial susceptibility testing of all isolates of Campylobacter spp. were performed.

Methods used for collecting data

Described in chapter: Thermophilic campylobacter in pigs

Laboratory methodology used for identification of the microbial isolates

Described in chapter: Thermophilic campylobacter in pigs

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Described in chapter: Thermophilic campylobacter in bovine animals.
The susceptibility testing was done with Sensititre® Microbiology Systems (MCS Diagnostics). The frozen Campylobacter jejuni/coli strains were subcultivated on Columbia agar (bioMerieux) and incubated 48 hours at 42°C in microaerophilic atmosphere. 3-5 colonies were suspended in physiological NaCl solution and adjusted to a McFarland of 0.5. 50 µl of the suspension were inoculated into 10 ml Mueller Hinton bouillon and incubated 48 hours at 37°C in microaerophilic atmosphere.
MIC values have been entered in a Microsoft® Excel datasheet.

Control program/mechanisms

The control program/strategies in place

Samples from food animals were monitored for antimicrobial residues according to a randomized sampling scheme (BMGF-74320/0003-IV/B/7/2005, Rückstandsuntersuchung-Durchführungserlass 2005).

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for antimicrobial resistance monitoring would be highly welcome.

Measures in case of the positive findings or single cases

Nil

Notification system in place

Nil

National evaluation of the recent situation, the trends and sources of infection

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

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

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

Additional information

Nil

C. Antimicrobial resistance of Campylobacter spp. in animal - Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling

Sampling strategy used in monitoring

Frequency of the sampling

Described in chapter: Thermophilic Campylobacter in poultry

Type of specimen taken

Described in chapter: Thermophilic Campylobacter in poultry

Methods of sampling (description of sampling techniques)

Described in chapter: Thermophilic Campylobacter in poultry

Procedures for the selection of isolates for antimicrobial testing

All 218 isolates of Campylobacter jejuni and 185 isolates of C. coli obtained in the monitoring program were sent to the IMED in Graz where the antimicrobial susceptibility testing of all isolates of Campylobacter spp. were performed.

Methods used for collecting data

Described in chapter: Thermophilic Campylobacter in poultry

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Described in chapter: Thermophilic campylobacter in bovine animals.
The susceptibility testing was done with Sensititre® Microbiology Systems (MCS Diagnostics). The frozen Campylobacter jejuni/coli strains were subcultivated on Columbia agar (bioMerieux) and incubated 48 hours at 42°C in microaerophilic atmosphere. 3-5 colonies were suspended in physiological NaCl solution and adjusted to a McFarland of 0.5. 50 µl of the suspension were inoculated into 10 ml Mueller Hinton bouillon and incubated 48 hours at 37°C in microaerophilic atmosphere.
MIC values have been entered in a Microsoft® Excel datasheet.

Control program/mechanisms

The control program/strategies in place

Samples from food animals were monitored for antimicrobial residues according to a randomized sampling scheme (BMGF-74320/0003-IV/B/7/2005, Rückstandsuntersuchung-Durchführungserlass 2005).

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for antimicrobial resistance monitoring would be highly welcome.

Measures in case of the positive findings or single cases

Nil

Notification system in place

Nil

National evaluation of the recent situation, the trends and sources of infection

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

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

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

Additional information

Nil

Table Antimicrobial susceptibility testing of C. coli in Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	C. coli Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	162

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	162	64				88	4	2	1	1	2	3	10	15	23	13						
Amphenicols																						
Chloramphenicol	162	1							131	27	2	1		1								
Fluoroquinolones																						
Ciprofloxacin	162	83		57	8	3		3	8	30	34	12	7									
Quinolones																						
Nalidixic acid	162	88							8	47	18	1	4	50	31	3						
Trimethoprim	162	155							2	1	4	2	17	20	116							
Aminoglycosides																						
Streptomycin	162	36						96	22	5	3	5	7	13	11							
Gentamicin	162	2				38	112	9	1			1		1								
Neomycin	162	1						140	20	1		1										
Macrolides																						
Erythromycin	162	11				70	38	28	12	3	1			5	1	4						
Penicillins																						
Amoxicillin/Clavulanic acid	162	0						43	80	35	4											
Ampicillin	162	9						29	14	51	55	4	1	4	3	1						
Polymyxins																						
Colistin	162	3								156	1	1	1	1	2							

Table Antimicrobial susceptibility testing of C. coli - qualitative data

n = Number of resistant isolates

	C. coli					
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl) and turkeys**	
Isolates out of a monitoring programme	yes		yes		yes	
Number of isolates available in the laboratory	22		219		162	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**
Amphenicols						
Chloramphenicol	22	0	219	0	162	1
Fluoroquinolones						
Ciprofloxacin	22	13	219	64	162	83
Quinolones						
Nalidixic acid	22	13	219	70	162	88
Trimethoprim	22	20	219	212	162	155
Aminoglycosides						
Streptomycin	22	3	219	171	162	36
Gentamicin	22	0	219	1	162	2
Neomycin	22	0	219	5	162	1
Macrolides						
Erythromycin	22	1	219	42	162	11
Penicillins						
Amoxicillin/Clavulanic acid	22	0	219	1	162	0
Ampicillin	22	0	219	34	162	9
Polymyxins						
Colistin	22	0	219	1	162	3
Tetracyclines						
Tetracyclin	22	9	219	168	162	64
Fully sensitive	22	0	219	3	162	1
Resistant to 1 antimicrobial	22	7	219	7	162	51
Resistant to 2 antimicrobials	22	2	219	39	162	13
Resistant to 3 antimicrobials	22	7	219	73	162	47
Resistant to 4 antimicrobials	22	3	219	44	162	25
Resistant to >4 antimicrobials	22	3	219	53	162	25

Table Antimicrobial susceptibility testing of C. coli in Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	C. coli Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	22

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	22	9				12	1							4	4	1						
Amphenicols																						
Chloramphenicol	22	0							21	1												
Fluoroquinolones																						
Ciprofloxacin	22	13		5	1	2	1			5	7	1										
Quinolones																						
Nalidixic acid	22	13							3	3	2	1	2	5	5	1						
Trimethoprim	22	20									2				20							
Aminoglycosides																						
Streptomycin	22	3						18	1					2	1							
Gentamicin	22	0				9	11	2														
Neomycin	22	0						20	2													
Macrolides																						
Erythromycin	22	1				12	2	7				1										
Penicillins																						
Amoxicillin/Clavulanic acid	22	0						15	7													
Ampicillin	22	0						7	4	7	2	2										
Polymyxins																						
Colistin	22	0								22												

Table Antimicrobial susceptibility testing of C. coli in Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	C. coli
	Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	219

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	219	168				34	5	2		3	7	18	27	32	48	34						
Amphenicols																						
Chloramphenicol	219	0							167	46	6											
Fluoroquinolones																						
Ciprofloxacin	219	64		106	30	7	1	5	6	29	28	6	1									
Quinolones																						
Nalidixic acid	219	70							12	51	66	20	8	30	25	7						
Trimethoprim	219	212					2	1	1	1	2	17	35	27	133							
Aminoglycosides																						
Streptomycin	219	171						12	18	11	7	3	27	93	48							
Gentamicin	219	1				46	141	31				1										
Neomycin	219	5						146	67		1	1	1	1	2							
Macrolides																						
Erythromycin	219	42				25	56	57	30	9		2	5	5	5	25						
Penicillins																						
Amoxicillin/Clavulanic acid	219	1						93	82	28	15					1						
Ampicillin	219	34						47	26	77	32	3	5	25	4							
Polymyxins																						
Colistin	219	1								203	7	6	2		1							

Table Antimicrobial susceptibility testing of C. jejuni in Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	C. jejuni Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	195

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	195	57				124	6	5	2	1		1	5	24	18	9						
Amphenicols																						
Chloramphenicol	195	0							175	16	4											
Fluoroquinolones																						
Ciprofloxacin	195	97		54	33	6	2	3		15	64	13	5									
Quinolones																						
Nalidixic acid	195	103							12	53	26	1	5	31	63	4						
Trimethoprim	195	192					1	1			1	4	10	18	160							
Aminoglycosides																						
Streptomycin	195	4						179	9	3			2	1	1							
Gentamicin	195	1				133	59	2				1										
Neomycin	195	1						189	5				1									
Macrolides																						
Erythromycin	195	6				130	47	9	3				2	1	2	1						
Penicillins																						
Amoxicillin/Clavulanic acid	195	2						145	41	7					1	1						
Ampicillin	195	35						43	51	43	14	9	16	11	7	1						
Polymyxins																						
Colistin	195	2								190	2	1			2							

Table Antimicrobial susceptibility testing of C. jejuni in Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	C. jejuni Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	141

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	141	41				90	3	2	1	1	3	2	5	11	12	11						
Amphenicols																						
Chloramphenicol	141	1							129	6	4	1	1									
Fluoroquinolones																						
Ciprofloxacin	141	42		68	18	6	1	3	3	4	26	9	3									
Quinolones																						
Nalidixic acid	141	50							13	56	19	3	6	10	31	3						
Trimethoprim	141	140								1		5	8	11	116							
Aminoglycosides																						
Streptomycin	141	8						129	3	1		3		1	4							
Gentamicin	141	0				90	47	2	2													
Neomycin	141	0						135	6													
Macrolides																						
Erythromycin	141	4				86	40	7	3	1	1	1				2						
Penicillins																						
Amoxicillin/Clavulanic acid	141	0						115	22	4												
Ampicillin	141	17						37	47	29	8	3	9	7		1						
Polymyxins																						
Colistin	141	0								132	6	3										

Table Antimicrobial susceptibility testing of C. jejuni - qualitative data

n = Number of resistant isolates

	C. jejuni					
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl) and turkeys**	
Isolates out of a monitoring programme	yes		yes		yes	
Number of isolates available in the laboratory	141		1		195	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**
Amphenicols						
Chloramphenicol	141	1	1	0	195	0
Fluoroquinolones						
Ciprofloxacin	141	42	1	1	195	97
Quinolones						
Nalidixic acid	141	50	1	1	195	103
Trimethoprim	141	140	1	1	195	192
Aminoglycosides						
Streptomycin	141	8	1	0	195	4
Gentamicin	141	0	1	0	195	1
Neomycin	141	0	1	0	195	1
Macrolides						
Erythromycin	141	4	1	0	195	6
Penicillins						
Amoxicillin/Clavulanic acid	141	0	1	0	195	2
Ampicillin	141	17	1	0	195	35
Polymyxins						
Colistin	141	0	1	0	195	2
Tetracyclines						
Tetracyclin	141	41	1	1	195	57
Fully sensitive	141	0	1	0	195	1
Resistant to 1 antimicrobial	141	65	1	0	195	77
Resistant to 2 antimicrobials	141	24	1	0	195	14
Resistant to 3 antimicrobials	141	24	1	0	195	45
Resistant to 4 antimicrobials	141	22	1	1	195	36
Resistant to >4 antimicrobials	141	6	1	0	195	22

Table Antimicrobial susceptibility testing of C. jejuni in Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	C. jejuni Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	1	1													1							
Amphenicols																						
Chloramphenicol	1								1													
Fluoroquinolones																						
Ciprofloxacin	1	1									1											
Quinolones																						
Nalidixic acid	1	1													1							
Trimethoprim	1	1													1							
Aminoglycosides																						
Streptomycin	1	0						1														
Gentamicin	1	0				1																
Neomycin	1	0						1														
Macrolides																						
Erythromycin	1	0						1														
Penicillins																						
Amoxicillin/Clavulanic acid	1	0						1														
Ampicillin	1	0						1														
Polymyxins																						
Colistin	1	0								1												

Table Antimicrobial susceptibility testing of Campylobacter in animals

n = Number of resistant isolates

	Campylobacter spp., unspecified							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Gallus gallus (fowl) and turkeys**	
Isolates out of a monitoring programme	yes		yes				yes	
Number of isolates available in the laboratory	163		220				357	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	163	50	220	169			357	121
Amphenicols								
Chloramphenicol	163	1	220	0			357	1
Fluoroquinolones								
Ciprofloxacin	163	55	220	65			357	180
Quinolones								
Nalidixic acid	163	63	220	71			357	191
Trimethoprim	163	160	220	213			357	347
Aminoglycosides								
Streptomycin	163	11	220	171			357	40
Gentamicin	163	0	220	1			357	3
Neomycin	163	0	220	5			357	2
Macrolides								
Erythromycin	163	5	220	42			357	17
Penicillins								
Amoxicillin/Clavulanic acid	163	0	220	1			357	2
Ampicillin	163	17	220	34			357	44
Polymyxins								
Colistin	163	0	220	1			357	5
Fully sensitive	163	0	220	3			357	2
Resistant to 1 antimicrobial	163	72	220	7			357	128
Resistant to 2 antimicrobials	163	26	220	39			357	27
Resistant to 3 antimicrobials	163	31	220	73			357	92
Resistant to 4 antimicrobials	163	25	220	45			357	61
Resistant to >4 antimicrobials	163	9	220	53			357	47

Table Antimicrobial susceptibility testing of Campylobacter spp. in Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	Campylobacter spp., unspecified Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	357

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	357	121				212	10	7	3	2	2	4	15	39	41	22						
Amphenicols																						
Chloramphenicol	357	1							306	43	6	1		1								
Fluoroquinolones																						
Ciprofloxacin	357	180		111	41	9	2	6	8	45	98	25	12									
Quinolones																						
Nalidixic acid	357	191							20	100	44	2	9	81	94	7						
Trimethoprim	357	347					1	1	2	1	5	6	27	38	276							
Aminoglycosides																						
Streptomycin	357	40						275	31	8	3	5	9	14	12							
Gentamicin	357	3				171	171	11	1			2		1								
Neomycin	357	2						329	25	1		1	1									
Macrolides																						
Erythromycin	357	17				200	85	37	15	3	1		2	6	3	5						
Penicillins																						
Amoxicillin/Clavulanic acid	357	2						188	121	42	4				1	1						
Ampicillin	357	44						72	65	94	69	13	17	15	10	2						
Polymyxins																						
Colistin	357	5								346	3	2	1	1	4							

Table Antimicrobial susceptibility testing of Campylobacter spp. in Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	Campylobacter spp., unspecified
	Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	163

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	163	50				102	4	2	1	1	3	2	5	15	16	12						
Amphenicols																						
Chloramphenicol	163	1							150	7	4	1	1									
Fluoroquinolones																						
Ciprofloxacin	163	55		73	19	8	2	3	3	9	33	10	3									
Quinolones																						
Nalidixic acid	163	63							16	59	21	4	8	15	36	4						
Trimethoprim	163	160								1	2	5	8	11	136							
Aminoglycosides																						
Streptomycin	163	11						147	4	1		3		3	5							
Gentamicin	163	0				99	58	4	2													
Neomycin	163	0						155	8													
Macrolides																						
Erythromycin	163	5				98	42	14	3	1	1	2				2						
Penicillins																						
Amoxicillin/Clavulanic acid	163	0						130	29	4												
Ampicillin	163	17						44	51	36	10	5	9	7		1						
Polymyxins																						
Colistin	163	0								154	6	3										

Table Antimicrobial susceptibility testing of Campylobacter spp. in Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	Campylobacter spp., unspecified
	Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	
Number of isolates available in the laboratory	220

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	220	169				34	5	2		3	7	18	27	32	49	43						
Amphenicols																						
Chloramphenicol	220	0							168	46	6											
Fluoroquinolones																						
Ciprofloxacin	220	65		106	30	7	1	5	6	29	29	6	1									
Quinolones																						
Nalidixic acid	220	71							12	51	66	20	8	30	26	7						
Trimethoprim	220	213					2	1	1	1	2	17	35	27	134							
Aminoglycosides																						
Streptomycin	220	171						13	18	11	7	3	27	93	48							
Gentamicin	220	1				47	141	31				1										
Neomycin	220	5						147	67		1	1	1	1	2							
Macrolides																						
Erythromycin	220	42				25	56	58	30	9		2	5	5	5	25						
Penicillins																						
Amoxicillin/Clavulanic acid	220	1						94	82	28	15					1						
Ampicillin	220	34						48	26	77	32	3	5	25	4							
Polymyxins																						
Colistin	220	1								204	7	6	2		1							

Table Breakpoints used for antimicrobial susceptibility testing of Campylobacter in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin	NCCLS			8	0.25	128				
Amphenicols										
Chloramphenicol	NCCLS			16	2	32				
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	NCCLS			2	0.06	32				
Enrofloxacin										
Quinolones										
Nalidixic acid	NCCLS			16	2	128				
Trimethoprim	NCCLS			8	0.5	64				
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin	NCCLS			8	1	64				
Gentamicin	NCCLS			8	0.25	64				
Neomycin	NCCLS			8	1	64				
Kanamycin										
Macrolides										
Erythromycin	NCCLS			4	0.25	128				
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins										
Penicillins										
Amoxicillin/Clavulanic acid	NCCLS			16	1	128				
Ampicillin	NCCLS			16	1	128				
Polymyxins										
Colistin	NCCLS			32	4	64				

2.3. LISTERIOSIS

2.3.1. General evaluation of the national situation

A. Listeriosis general evaluation

History of the disease and/or infection in the country

Listeriosis can be regarded as a relatively rare infectious disease in Austria with an annual incidence between 0.1 and 0.25 cases per 100,000 inhabitants in the years 1996 to 2004. In 2005 a total of 20 culturally verified human cases of listeriosis were recorded for Austria, none of them was associated with pregnancy. The incidences are similar to those of most other western European countries (0.2-0.7). Lethality was high with 20% (4 out of 20) in 2005. This (usually) high rate and the sometimes severe permanent disabilities demand every effort to ascertain potential food-associated outbreaks as early as possible. However, the geographical distribution and the molecular subtyping results argue against any epidemic in Austria in 2005 (Würzner R, Heller I, Grif, K 2006. Taetigkeitsbericht für das Jahr 2005. Mitteilungen der Sanitaetsverwaltung 4/2006: in press)

National evaluation of the recent situation, the trends and sources of infection

See 2.3.1.A. History of the disease

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Listeriosis is a rare disease, but not a rare bacterium, which means that a systemic disease develops only under certain particular predispositions, including pregnancy and immunosuppression.
Although dairy products and salmon are likely candidates, the source of an infection often remains unclear. Ready to eat meat and meat products harbour listeria in 0 - 7 % and ready to eat smoked fish in 9 %.

Recent actions taken to control the zoonoses

A monthly report is sent to the Ministry of Health by the National Reference Laboratory, whereas outbreaks are reported immediately.
Restrictions tightened to sell unpasteurised milk in remote areas (Alps).

Suggestions to the Community for the actions to be taken

More widespread information for pregnant and immunosuppressive persons.

Additional information

The National Reference Laboratory at Innsbruck Medical University coordinates the confirmation, subtyping and comparison of isolates.

2.3.2. Listeria in foodstuffs

A. Listeria spp., unspecified in food - All foodstuffs - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling

Monitoring system

Sampling strategy

No surveillance programmes are applied.
Foodstuff was sampled according to the Erlass der Bundesministerin für Gesundheit und Frauen: Revisions- und Probenplan für das Jahr 2004; Richtlinien über die Vollziehung der Überwachung des Verkehrs mit den durch das LMG 1975 erfassten Waren (GZ BMGF-75500/0087--IV/B/10/2004 of 23.12.2004). The Revision-Plan determines the number of food enterprises e.g. restaurants, dairies, retail etc. that have to be tested randomly per province according to the number of food enterprises per province. Each business has to be sampled at least once per year. The inspection can comprise sampling, hygienic investigations of the employees, checking of HACCP, control of manufacturing processes etc.
The sampling plan determines the number of samples of each class of goods, as raw meat, fresh or frozen; sausages; cheeses; milk; fish; preserved food etc. that have to be investigated randomly. Samples from suspected foodstuffs are taken following outbreak investigation, complaint, confiscation, violation etc.

Diagnostic/analytical methods used

At the production plant

Bacteriological method: ISO 11290- Qualitative detection of Listeria spp. is performed according to ISO 11290: Part 1 (1996). Quantification of Listeria spp. content in food is conducted either according to ISO 11290: Part 2 (1998) with following modifications: Listeria monocytogenes are confirmed on Ottaviani Agosti Agar, ALOA Agar, RapidLmono agar, using Gram stain, motility testing and catalase production or by the Api Listeria test or Vidas LMO II.:1996, 1998

National evaluation of the recent situation, the trends and sources of infection

Listeria monocytogenes was detected in samples of cheeses in 1.7 % from cow milk (26/1554), 2.9 % from goat milk (2/68) and 0 % from sheep milk. In one sample of cheeses from cow milk the content of L. monocytogenes was > 100 cfu/g.
In 3.5 % of meat samples from different animals species (12/369 broiler meat, 5/174 pig meat and 2/7 bovine meat samples) L. monocytogenes was found but always at a lower content than 100/g.
9.6 % of samples from fish (sushi, smoked fish, fish and fish product) revealed a contamination with L. monocytogenes, the quantification showed 3 samples with a higher cfu than 100 per gram.

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Definition used	Units tested	=<100 cfu/g	>100 cfu/g	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g
Milk, cows'	V)	single	1g		9			0	0
raw									
intended for direct human consumption	I)	single	25g		26			0	0
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products	I)	single	25g		9			0	0
pasteurised milk	XI)	single	25g		278			0	0
(other sample size)	VI)	single	1g		13			0	0
Milk, goats'									
raw									
intended for direct human consumption	I)	single	25g		3			0	0
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products	I)	single	25g		1			0	0
pasteurised	I)	single	25g		1			0	0
Cheeses made from cows' milk	I)	single	25g		435	24	1	25	25
soft and semi-soft									
made from raw or low heat-treated milk	I)	single	25g		214	1	0	1	1
made from pasteurized milk	I)	single	25g		538			0	0
hard	VI)	single	1g		192			0	0
made from raw or low heat-treated milk	I)	single	25g		50			0	0
made from pasteurized milk	XII)	single	25g		56			0	0
(other sample size)	VII)	single	1g		69			0	0

Cheeses made from goats' milk	I)	single	25g		8			0	0
soft and semi-soft									
made from raw or low heat-treated milk	I)	single	25g		17			0	0
made from pasteurized milk	I)	single	25g		43	2	0	2	2
Cheeses made from sheep's milk	I)	single	25g		3			0	0
soft and semi-soft									
made from raw or low heat-treated milk	I)	single	25g		5			0	0
made from pasteurized milk	I)	single	25g		39			0	0
hard									
made from raw or low heat-treated milk	I)	single	25g		3			0	0
made from pasteurized milk	I)	single	25g		10			0	0
Dairy products (excluding cheeses)									
butter	XIII)	single	25g		47			0	0
(other sample size)	VIII)	single	1g		82			0	0
cream	I)	single	25g		54			0	0
dairy products, not specified									
made from pasteurized milk	IX)	single	1g		88			0	0
dairy desserts	X)	single	1g		428			0	0
(other sample size)	XIV)	single	25g		152			0	0

Footnote

I) all 5 AGES Institutes + LUA Vorarlberg + LUA Carinthia + MA 38 II) ILMU Innsbruck VII) ILMU Graz, Linz VIII) ILMU Linz, Innsbruck IX) ILMU Linz X) ILMU Graz, Innsbruck XI) ILMU Graz, Linz, Salzburg, Wien + LUA Vorarlberg + LUA Carinthia + MA 38 XII) ILMU Salzburg, Wien + LUA Vorarlberg + LUA Carinthia + MA 38 XIII) ILMU Graz, Salzburg, Wien + LUA Vorarlberg + LUA Carinthia + MA 38 XIV) ILMU Wien

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Definition used	Units tested	=<100 cfu/g	>100 cfu/g	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g
Meat from broilers (Gallus gallus)									
fresh	I)	single	25g		354	11	0	11	11
meat products									
cooked, ready-to-eat	I)	single	25g		15	1	0	1	1
Meat from pig									
fresh	I)	single	25g		13			0	0
meat products									
cooked, ready-to-eat	I)	single	25g		161	5	0	5	5
fermented sausages	I)	single	25g		32	2	0	2	2
Meat from bovine animals									
fresh	I)	single	25g		5	2	0	2	2
minced meat									
intended to be eaten cooked	IX)	single	1g		2			0	0
Fish									
smoked	I)	single	25g		389	35	0	35	35
Crustaceans									
unspecified									
cooked	I)	single	25g		7			0	0
(other sample size)	IX)	single	1g		6			0	0
Molluscan shellfish									
cooked	I)	single	25g		2			0	0
Infant formula	I)	single	25g		12			0	0
Foodstuffs intended for special nutritional uses									
ready-to-eat	IX)	single	1g		22			0	0
Fishery products, unspecified	I)	single	25g		69	7	2	9	9
raw	I)	single	25g		33	2	1	3	3
Meat from poultry, unspecified	I)	single	25g		8	1	0	1	1

Meat from other animal species or not specified									
meat products	I)	single	25g		95			0	0
Other processed food products and prepared dishes									
unspecified									
ready-to-eat foods	I)	single	25g		287	4	0	4	4
Other food	I)	single	25g		20	3	0	3	3
(from community caterings)	I)	single	25g		8			0	0

Footnote

I) all 5 AGES Institutes + LUA Vorarlberg + LUA Carinthia + MA 38 IX) ILMU Linz

2.3.3. Listeria in animals

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

History of the disease and/or infection in the country

In 2005 315 samples were tested by phenotypic, genotypic and molecular-epidemiological methods at the Austrian Reference Laboratory for EHEC. In total, 45 EHEC (39 culture- and 6 serologically confirmed) and 14 VTEC/STEC (shigatoxin producing E. coli without eae-gene) were diagnosed. The number of human EHEC non-O157 (18 isolates) was comparable to the year 2004 (21 isolates). In contrast, the number of O157 cases (21 isolates, 6 serologic cases) slightly increased (15 isolates and 7 serologic cases in 2004). Among the 45 diagnosed EHEC cases of the year 2005, seven patients developed a haemolytic-uraemic syndrome (HUS) and one a nephritic insufficiency. All but one of these were caused by EHEC O157, in one HUS case O111:H- was identified.
The incidence of HUS in children due to EHEC was between 0.3 to 0.65 HUS-cases per 100.000 children (between 0 and 14 years) in the years 1999-2005.

National evaluation of the recent situation, the trends and sources of infection

See 2.4.1.A. History of the disease

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

In 2005 6.0% (CI 3.1 - 10.5; 12 out of 201 samples) of slaughtered bovine animals were positive in the VT ELISA. VTEC could be isolated from 3.0% (CI 1.1 - 6.4; 6 out of 201 samples). One isolate, an E. coli O157:H7, positive for stx1 and stx2, was the only that harboured the eae-gene for the virulence factor Intimin. In 2004, in 1 out 287 samples (0.3%) E. coli O163:H- harbouring stx1, eae and EHEC-hly could be detected.
4.3% (CI 1.2 - 10.8; 4 out of 92 samples) of slaughtered sheep were positive in the VT-ELISA and from all 4 samples VTEC could be isolated. None of these isolates harboured the intimin gene.
The data of two outbreaks in Austria involving environmental transmission or animal contact have been published as full papers (Grif et al., 2005, Eur J Clin Microbiol Infect Dis 24: 268-271 & Orth et al., 2006, Epidemiol Infect, in press).

Recent actions taken to control the zoonoses

An Austrian wide monitoring program on the trends of VTEC prevalence in bovine animals and sheep/goats was implemented according to the directive 2003/99/EC of the European Parliament and the Council of 17 November 2003 in the National Order GZ: BMGF-74600/0092--IV/B/8/05 (Überwachungsprogramme 2005 zu ausgewählten Zoonosen und Antibiotikaresistenzen). The sampling was carried out from 30 May to 2 December 2005 and follow up programs will be realized in the forthcoming years.

Suggestions to the Community for the actions to be taken

More widespread information for parents, paediatrics and general practioners.

Additional information

The National Reference Laboratory at Innsbruck Medical University coordinates the confirmation, subtyping and comparison of isolates. In addition, the Reference Laboratory is involved in outbreak investigations. When EHEC is diagnosed in a patient's specimen the patient and his family are interviewed using a questionnaire. Thereby, information about the clinical illness of the patient and the exposure in the 6 days prior to the onset of the illness is collected. Thus, the Reference Laboratory contributes to finding the source of infection. The Reference Laboratory is also in close contact with the Local and Regional Health Authorities by reporting EHEC cases and discussing the necessary environmental investigations.

2.4.2. Escherichia coli, pathogenic in foodstuffs

A. Verotoxigenic E. coli (VTEC) in food

Monitoring system

Sampling strategy

No surveillance programmes are applied.
Foodstuff was sampled according to the Erlass der Bundesministerin für Gesundheit und Frauen: Revisions- und Probenplan für das Jahr 2004; Richtlinien über die Vollziehung der Überwachung des Verkehrs mit den durch das LMG 1975 erfassten Waren (GZ BMGF-75500/0087--IV/B/10/2004 of 23.12.2004). The Revision-Plan determines the number of food enterprises e.g. restaurants, dairies, retail etc. that have to be tested randomly per province according to the number of food enterprises per province. Each business has to be sampled at least once per year. The inspection can comprise sampling, hygienic investigations of the employees, checking of HACCP, control of manufacturing processes etc.
The sampling plan determines the number of samples of each class of goods, as raw meat, fresh or frozen; sausages; cheeses; milk; preserved food etc. that have to be investigated randomly.
Samples from suspected foodstuffs are taken following outbreak investigation, complaint, confiscation, violation etc.

Diagnostic/analytical methods used

Suspected food was preenriched in modified tryptic soy bouillon containing novobiocin at 37°C for 24 hours. The enrichment is plated on Fluorocult® ECD Agar or Chromocult Coliformen Agar at 37°C for 24 hours. The enrichment or E. coli colonies are tested in PCRs for harbouring Shiga Toxin 1 and/or 2 genes (Brian MJ et al., 1992: Polymerase chain reaction for diagnosis of enterohemorrhagic Escherichia coli infection and haemolytic-uremic syndrome. J. Clin. Microbiol. 30, pp. 1801-1806). Each Shiga-Toxin producing E. coli is serotyped in the National Reference Laboratory for EHEC and virulence factors are determined.

National evaluation of the recent situation, the trends and sources of infection

In 1 out of 344 samples comprised of meat samples from different animals, milk samples, cheeses etc. tested VTEC could be assessed. The VTEC positive sample was a raw milk from a cow, intended to be eaten raw.

Table VT E.coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Escherichia coli, pathogenic	E. coli spp., unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC O157:H7	Verotoxigenic E. coli (VTEC) - VTEC O6:H10	Verotoxigenic E. coli (VTEC) - VTEC O100:H-	Verotoxigenic E. coli (VTEC) - VTEC O113:H4	Verotoxigenic E. coli (VTEC) - VTEC NT (Not Typeable)
Meat from broilers (Gallus gallus)												
fresh	XVII)	single	25g	7	0							
Meat from turkey												
fresh	XVII)	single	25g	2	0							
Meat from pig												
fresh	XVII)	single	25g	3	0							
minced meat												
intended to be eaten raw	XVII)	single	25g	1	0							
intended to be eaten cooked	XVII)	single	25g	1	0							

meat products	XVII)	single	25g	2	0								
fermented sausages	XVII)	single	25g	11	0								
Meat from bovine animals	XVII)	single	25g	16	0								
fresh													
minced meat													
intended to be eaten cooked	XVII)	single	25g	1	0								
Milk, cows'													
raw	XVII)	single	25g	3	0								
intended for direct human consumption	XVII)	single	25g	10	1								1
raw milk for manufacture													
intended for manufacture of raw or low heat-treated products	XVII)	single	25g	13	0								
Milk, goats'													
raw													
intended for direct human consumption	XVII)	single	25g	14	0								
Vegetables	XVII)	single	25g	7	0								
Meat, mixed meat													
minced meat													
intended to be eaten cooked	XVII)	single	25g	159	3				1	1	1		
Cheeses made from cows' milk													
unspecified													
made from raw or low heat-treated milk	XVII)	single	25g	7	0								
Cheeses made from goats' milk													
unspecified													

made from raw or low heat-treated milk	XVII)	single	25g	1	0							
Fishery products, unspecified	XVII)	single	25g	6	0							
Other processed food products and prepared dishes												
unspecified	XVII)	single	25g	71	0							

Footnote

XVII) ILMU Salzburg, Linz, Innsbruck, Vienna, Graz
All VTEC negative for eae-gen.

2.4.3. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

The monitoring program on the prevalence of VTEC in slaughtered animals: At an estimated prevalence for VTEC of 2.5%, based on the results from the monitoring in 2004, and a desired accuracy of 2.5% for a confidence level of 95%, 207 slaughtered bovine animals had to be tested, calculated on approximately 664,000 slaughtered bovine animals in 2003 in Austria.
The sampling had been stratified on the number of slaughtering by abattoirs all over Austria but not on time. The sampling was equally distributed over the period of the study.
In Austria, all 68 abattoirs in which more than 500 bovine animals were slaughtered in 2003 accounted for approximately 83% of the total annual bovine production. Sampling was performed in the 48 of the 68 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 20 samples were distributed over the 48 abattoirs.

Frequency of the sampling

Animals at slaughter (herd based approach)

Detection of annual prevalence of Detection of annual prevalence of 2.5 % at a 2.5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005. by Detection of annual prevalence of 2.5 % at a 2.5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005.% confidence level and Detection of annual prevalence of 2.5 % at a 2.5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005.% accuracy

Type of specimen taken

Animals at slaughter (herd based approach)

Other: Colon containing 50 to 100 grams of faeces.

Methods of sampling (description of sampling techniques)

Animals at slaughter (herd based approach)

The sampling was performed by official veterinarians carrying out the post-mortem inspection. At time of evisceration a part of the colon was ligated and wrapped in a sterile plastic bag. After cooling down to 4°C the sample was sent in a hobbock or polystyrene box after adding cooling units to the locally

appropriate Institute of Veterinary Diseases Control (IVET). All samples were forwarded to the IVET in Linz, where the VTEC - examinations were carried out. In the laboratory some content of each colon was inoculated into bouillon.

Case definition

Animals at slaughter (herd based approach)

A bovine animal is considered to be infected with VTEC following the isolation of VTEC from its colon.

Diagnostic/analytical methods used

Animals at slaughter (herd based approach)

Other: At first approximately 1g content of the colon was preenriched in modified tryptic soy bouillon containing novobiocin (mTSB + n) for 5 hours at 37 °C on a shaker. Then 1ml was inoculated into mTSB + n containing mitomycin C for 18-20 hours at 37°C on a shaker too. The process was followed by testing the enrichment for the occurrence of verotoxin in an enzyme immune assay (Ridascreen®, Premier (TM) EHEC). Positive enrichments were plated on MacConkey (MAC) - and on cefixime tellurite sorbitol MAC (CTSMAC) agar and incubated for 24 hours at 37°C. 2-4 colonies from each of the plates were subcultered on MAC as well as on CTSMAC. Afterwards the genomes of subcultered E. coli were investigated in a real time PCR for harboring the genes for Verotoxin 1, Verotoxin 2, Intimin and Enterohemolysin (Reischl U. et al. (2002): Real-Time Fluorescence PCR Assays for Detection and Characterization of Shiga Toxin, Intim and Enterohemolysin Genes from Shiga Toxin-Producing Escherichia coli. Journ. of Clin. Microb., 40, p. 2555-2565). The serotyping was carried out by the National Reference Laboratory for EHEC and in the Statens Serum Institut in Copenhagen, Denmark. Statistical analysis was performed with EpiInfo version 3.3.2.

Vaccination policy

No vaccination

Other preventive measures than vaccination in place

No measures

Control program/mechanisms

Suggestions to the Community for the actions to be taken

Harmonization of methods

Measures in case of the positive findings or single cases

No measures foreseen

Notification system in place

Findings of VTEC in animals are not notifiable.

B. Verotoxigenic E. coli (VTEC) in animal - Sheep and goats

Monitoring system

Sampling strategy

Monitoring program on the prevalence of VTEC in slaughtered animals: At an estimated prevalence for VTEC of 1.1%, based on the results from the monitoring in 2004, and a desired accuracy of 5% for a confidence level of 95%, 101 slaughtered sheep and goats had to be tested, calculated on approximately 95.000 slaughtered sheep and goats in 2003 in Austria.
The sampling had been stratified on the number of slaughtering by abattoirs all over Austria but not on time. The sampling was equally distributed over the period of the study.
In Austria, all 17 abattoirs in which more than 200 sheep and goats were slaughtered in 2003 accounted for more than 92% of the total annual sheep and goat production. Sampling was performed in the 10 abattoirs.
The sampling was carried out from 30 May to 2 December 2005 and follow up programs will be realized in the forthcoming years.

Frequency of the sampling

Animals at slaughter (herd based approach)

Detection of annual prevalence of Detection of annual prevalence of 1.1 % at a 5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005. by Detection of annual prevalence of 1.1 % at a 5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005.% confidence level and Detection of annual prevalence of 1.1 % at a 5% desired accuracy for a 95% level of confidence. The sampling was equally distributed over the period of the study from 30 May to 2 December 2005.% accuracy

Type of specimen taken

Animals at slaughter (herd based approach)

Other: Colon containing 50 to 100 grams of faeces.

Methods of sampling (description of sampling techniques)

Animals at slaughter (herd based approach)

The sampling was performed by official veterinarians carrying out the post-mortem inspection. At time of evisceration a part of the colon was ligated and wrapped in a sterile plastic bag. After cooling down to 4°C the sample was sent in a hobbock or polystyrene box after adding cooling units to the locally appropriate Institute of Veterinary Diseases Control (IVET). All samples were

forwarded to the IVET in Linz, where the VTEC examinations were carried out. In the laboratory some content of each colon was inoculated into bouillon.

Case definition

Animals at slaughter (herd based approach)

A sheep or goat is considered to be infected with VTEC following the isolation of VTEC from its colon.

Diagnostic/analytical methods used

Animals at slaughter (herd based approach)

Other: At first approximately 1g content of the colon was preenriched in modified tryptic soy bouillon containing novobiocin (mTSB + n) for 5 hours at 37 °C on a shaker. Then 1ml was inoculated into mTSB + n containing mitomycin C for 18-20 hours at 37°C on a shaker too. The process was followed by testing the enrichment for the occurrence of verotoxin in an enzyme immune assay (Ridascreen®, Premier (TM) EHEC). Statistical analysis was performed with EpiInfo version 3.3.2.

Vaccination policy

No vaccination

Other preventive measures than vaccination in place

No measures

Control program/mechanisms

Suggestions to the Community for the actions to be taken

Harmonization of methods

Measures in case of the positive findings or single cases

No measures foreseen

Notification system in place

Findings of VTEC in animals are not notifiable.

Table VT E.coli in animals

	Source of information	Sampling unit	Units tested	Total units positive for Escherichia coli, pathogenic	E. coli spp., unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC O157:H7	Verotoxigenic E. coli (VTEC) - VTEC O76:H19	Verotoxigenic E. coli (VTEC) - VTEC O26:H-	Verotoxigenic E. coli (VTEC) - VTEC O6:H10	Verotoxigenic E. coli (VTEC) - VTEC O157:H16	Verotoxigenic E. coli (VTEC) - VTEC O157:H18	Verotoxigenic E. coli (VTEC) - VTEC O174:H21	Verotoxigenic E. coli (VTEC) - VTEC O174:H2	Verotoxigenic E. coli (VTEC) - VTEC O1:H10	Verotoxigenic E. coli (VTEC) - VTEC O66:H28
Cattle (bovine animals)																
calves (under 1 year)	VII)	Animals	7	2		0	0	0	0	0	0	0	1	1	0	0
meat production animals	VII)	Animals	56	1		1	0	0	0	0	0	1	0	0	0	0
dairy cows	VII)	Animals	138	3		2	1	0	0	0	1	0	0	0	1	0
Sheep	VII)	Animals	92	4		0	0	1	1	1	0	0	0	0	0	1

Footnote

VII) AGES Institute for Veterinary Disease Control in Linz

2.5. TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1. General evaluation of the national situation

A. Tuberculosis General evaluation

History of the disease and/or infection in the country

Human tuberculosis has steadily declined during the last decades. In 2005 Mycobacterium bovis accounted for 0,02 per 100.000 and M. caprae for 0,05 per 100.000 of all human cases (definite and other than definite cases). Incidence of definitive human tuberculosis was 7.46/100.000 (610 cases) and an overall incidence of 11,51/100.000 (941 cases definite and other than definite cases combined) in 2005.

National evaluation of the recent situation, the trends and sources of infection

Bovine tuberculosis poses no major public health problem. Cattle, sheep, goats and pigs are free of bovine tuberculosis: no single case was detected in 2005

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Absence of positive findings in 2005

Recent actions taken to control the zoonoses

No new measures implemented

Suggestions to the Community for the actions to be taken

Continuation of the existing control programs.

Additional information

Nil

2.5.2. Mycobacterium in animals

A. Mycobacterium bovis in Bovine Animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Yes

Additional information

According to Council Directive 64/432/EWG from June 26th 1964 Austria has the status Officially Tuberculosis Free Member State declared in the Commission Decision 1999/467/EC from July 15th, 1999, replaced by Commission Decision 2003/467/EC from June 23rd, 2003. The national surveillance programme is regulated by the Directive GZ 39.624/9-IX/A/8/00. The monitoring programme is based on the compulsory ante-mortem and post-mortem inspection in which all cattle and goats originating from an official tuberculosis free holding have to be tested for tuberculous alterations.

Monitoring system

Sampling strategy

Specimen from carcasses with macroscopically alterations suspicious for tuberculosis of are sampled in slaughterhouses and sent to an Institute for Veterinary Diagnosis.

Frequency of the sampling

Permanent post-mortem inspections of each slaughtered bovine and caprine animal.

Type of specimen taken

Other: Organs/ tissues: Macroscopically tuberculous alterations and lymph nodes

Methods of sampling (description of sampling techniques)

The alterations and lymph nodes are excised and sent to the laboratory.

Case definition

According to Order Richtlinien für die veterinärbehördliche Überwachung zur Erhaltung der Freiheit der österreichischen Rinderbestände von Rindertuberkulose und zur Durchführung und Beurteilung der intrakutanen Tuberkulinprobe (GZ 39.624/9-IX/A/8/00): Tubercles pathognomically for tuberculosis detected in course of the post-mortem inspection or Mycobacterium bovis or Mycobacterium tuberculosis isolated from suspected material.

Diagnostic/analytical methods used

- Staining: Ziehl-Neelsen stains are performed on histological preparation and smears of the sample material

- Culture: After decontamination of the homogenised sample material in NALC and centrifugation, the sample material is transferred in parallel on Loewenstein-Jensen agar containing glycerol and PACT and Stonebrink agar containing PACT and Middlebrook medium. The media are incubated at 37°C up to 8 weeks.
- Confirmation of the Mycobacterium species by PCR (De los Monteros et al. 1998: Journal of Clinical Microbiology 36: 239-242) in the National Reference Laboratory for Tuberculosis in Animals.

Vaccination policy

Vaccination is not allowed.

Other preventive measures than vaccination in place

Compulsory ante-mortem and post-mortem inspection of all slaughtered bovine and caprine carcasses originating from official tuberculosis free holding.

Control program/mechanisms

The control program/strategies in place

The control programs are based on the compulsory ante-mortem and post-mortem inspection of all slaughtered bovine and caprine carcasses originating from an official tuberculosis free holding.

Recent actions taken to control the zoonoses

No need at the moment.

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

- The carcass is condemned.
- Loss of the status OTF for the holding from which the animal was originated and for contact holdings.
- Slaughtering of cows and goats from NON-OTF-holdings is forbidden
- Prohibition of keeping these animals together with animals from OTF-holdings on mountain pastures, market places etc.

Regaining the status OTF:
- There are no animals in the holding showing signs of clinical tuberculosis
- All animals are recruited from an OTF-holding
- M. bovis reactors after performing the skin test and contact animals have been eliminated as well as the compulsory follow-up examination and disinfection have been carried out
- No reactors identified after two intradermal testings of all animals in the holding older than 6 months examined earliest 60 days (first tuberculin test) and earliest 4 months (second tuberculin test) but latest 12 months after elimination of the last reactor.

Notification system in place

A suspicion of tuberculosis has to be notified by the veterinarian/animal keeper/the person who takes care of the animals/other persons to the mayor, by the veterinarian additionally to the local authority and the diagnostic finding by the institute for Veterinary diagnosis as well to the local authority as to the office of the provincial government responsible for the holding, from which the tuberculosis-positive animal was originated. (BGBl. 1994/395, Fleischuntersuchungsverordnung, § 10 (8), as amended or BGBl. 1909/177, Tierseuchengesetz, as amended).

Results of the investigation

Link to Table 1.1.1.

National evaluation of the recent situation, the trends and sources of infection

In the area of Northern Tyrol and Southern Bavaria there is an endemic area for deer infected with M. caprae (Prodinger, W. M., A. Eigentler, F. Allerberger, M. Schonbauer, and W. Glawischnig. 2002. Infection of red deer, cattle, and humans with Mycobacterium bovis subsp. caprae in Western Austria. J. Clin. Microbiol. 40:2270-2272). Following the excretion of mycobacteria by the deer on mountain pastures the cows can be infected pasturing on the contaminated feedlots. (Last cases in cows notified in 2002).

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

Nil

Additional information

M. caprae is differentiated in Austria.

B. Mycobacterium bovis in farmed deer

Monitoring system

Sampling strategy

Nil

Frequency of the sampling

Permanent post-mortem inspections of each slaughtered animal

Type of specimen taken

Other: Other: Macroscopically tuberculous alterations and lymph nodes

Methods of sampling (description of sampling techniques)

The alterations and lymph nodes are excised and sent to the laboratory

Case definition

Tubercles pathognomically for tuberculosis detected in course of the post-mortem inspection or Mycobacterium bovis or Mycobacterium tuberculosis isolated from suspected material

Diagnostic/analytical methods used

- Staining: Ziehl-Neelsen stain is performed on histological preparation and smears of the sample material
- Culture: After decontamination of the homogenised sample material in NALC and centrifugation, the sample material is transferred in parallel on Loewenstein-Jensen agar containing glycerol and PACT and Stonebrink agar containing PACT and Middlebrook medium. The media are incubated at 37 °C up to 8 weeks.
- Confirmation of the Mycobacterium species by PCR (De los Monteros et al. 1998: Journal of Clinical Microbiology 36: 239-242) in the National Reference Laboratory for Tuberculosis in Animals

Vaccination policy

Vaccination is not allowed

Other preventive measures than vaccination in place

Nil

Control program/mechanisms

The control program/strategies in place

The control programs are based on the compulsory ante-mortem and post-mortem inspection of all slaughtered carcasses originating from an official tuberculosis free holding

Recent actions taken to control the zoonoses

No need at the moment

Measures in case of the positive findings or single cases

The carcass is condemned. Further measures according to Tierseuchengesetz RGBl. 1909/177 as amended.

Notification system in place

The suspicion and finding of tuberculosis is notifiable according to BGBl. 1994/395, Fleischuntersuchungsverordnung, as amended) and RGBl. 1909/177, Tierseuchengesetz, as amended.

National evaluation of the recent situation, the trends and sources of infection

No cases in 2005 in Austria.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as

a source of infection)

No cases in 2005 in Austria.

Additional information

Nil

C. Mycobacterium spp., unspecified in animal - Other animals - at slaughterhouse - Control or eradication programmes - national programmes (no Community co-financing) - official sampling

Monitoring system

Sampling strategy

Samples from macroscopically suspected swine are taken in slaughterhouses

Frequency of the sampling

Permanent post-mortem inspections of each slaughtered animal

Methods of sampling (description of sampling techniques)

The alterations and lymph nodes are excised and sent to the laboratory

Case definition

Tubercles pathognomically for tuberculosis detected in course of the post-mortem inspection or Mycobacterium bovis or Mycobacterium tuberculosis or Mycobacterium avium isolated from suspected material

Diagnostic/analytical methods used

- Staining: Ziehl-Neelsen stains are performed on histological preparation and smears of the sample material
- Culture: After decontamination of the homogenised sample material in NALC and centrifugation, the sample material is transferred in parallel on Loewenstein-Jensen agar containing glycerol and PACT and Stonebrink agar containing PACT and Middlebrook medium. The media are incubated at 37°C up to 8 weeks.
- Confirmation of the Mycobacterium species by PCR (De los Monteros et al. 1998: Journal of Clinical Microbiology 36: 239-242) in the National Reference Laboratory for Tuberculosis in Animals

Vaccination policy

Vaccination is not allowed

Other preventive measures than vaccination in place

Nil

Control program/mechanisms

The control program/strategies in place

The control programs are based on the compulsory ante-mortem and post-mortem inspection of all slaughtered carcasses originating from an official tuberculosis free holding

Recent actions taken to control the zoonoses

No need at the moment

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

The carcass is condemned. Further measures according to Tierseuchengesetz RGBl. 1909/177 as amended.

Notification system in place

The suspicion and finding of tuberculosis is notifiable according to BGBl. 1994/395, Fleischuntersuchungsverordnung, as amended) and RGBl. 1909/177, Tierseuchengesetz, as amended.

National evaluation of the recent situation, the trends and sources of infection

No cases in 2005 in Austria.

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

No cases in 2005 in Austria.

Additional information

Nil

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Sheep	VII)	Animal	295061	0			
Goats	VII)	Animal	50564	0			
Pigs	VII)	Animal	5240966	0			
Other animals	VII)	Animal	4668	0			

Footnote

VII) Central Veterinary Services, Federal Ministry of Health and Women

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
ÖSTERREICH	83138	2021901	83138	100	0	0		0	831	0	0
Total	83138	2021901	83138	100	0	0	0	0	831	0	0

Footnote

Interval between routine tuberculin tests: (a) no routine tests;
Source of information: Central Veterinary Services

2.6. BRUCELLOSIS

2.6.1. General evaluation of the national situation

A. Brucellosis General evaluation

History of the disease and/or infection in the country

Since decades, in Austria human brucellosis is considered to be an imported infectious disease. Austria has the status Officially Brucellosis Free (OBF).

National evaluation of the recent situation, the trends and sources of infection

All human cases occurring in Austria in 2005 (n = 2) concerned immigrant workers who returned from their holiday at home and were most likely acquired abroad.

Recent actions taken to control the zoonoses

No new measures implemented

Suggestions to the Community for the actions to be taken

Continuation of the existing control programs

Additional information

Nil

2.6.2. Brucella in foodstuffs

A. Brucella spp., unspecified in food

Monitoring system

Sampling strategy

Due to the fact that Austria is OBF and OBmF, food is not investigated for Brucella spp..

2.6.3. Brucella in animals

A. Brucella abortus in Bovine Animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Yes

Additional information

According to the Council Directive 64/432/EEC of 26 June 1964, Austria revealed upon request in Commission Decision of 27 October 2000 amending for the third time Decisions 1999/466/EC and 1999/467/EC establishing respectively the officially brucellosis-free and tuberculosis-free status of bovine herds of certain Member States or regions of Member States, the officially brucellosis-free status of bovine herds.

Monitoring system

Sampling strategy

- Periodical monitoring scheme: Blood samples from cattle older than 2 years are monitored by means of serological tests. Samples are taken in the holdings; the sampling is part of a periodical monitoring scheme.
Abortion or premature birth: Abortive material and blood of the cow is sampled

Frequency of the sampling

- Periodical monitoring scheme: Annually in 20% of the holdings in each province all cattle >= 2 years had to be examined. All holdings in each province were tested at least once in five years. Principally the sampling was performed during the cold season, between January and May and in November and December when the animals were kept in the stables.
- Abortion or premature birth: Abortion material and blood from the cow that had an abort was sampled immediately post abortion. If the result of the first serological examination was negative, a second blood sample was taken 2 weeks post abortion and tested again serologically. If this result was negative again, sampling and testing was repeated after two weeks.

Type of specimen taken

Other: - Periodical monitoring scheme: Blood samples

Methods of sampling (description of sampling techniques)

- Periodical monitoring scheme: Individual blood samples are taken in the holdings and sent to the laboratories.
- Abortion or premature birth: Abortive material and blood samples of the cow that had an abort was sent to a veterinary laboratory.

Case definition

An animal is considered to be positive for Brucella abortus, in case of positive serological

test result and the epidemiological situation of the herd indicates the possibility that a brucella infection has been introduced to the herd (BGl 1957/280, Bangseuchen-Verordnung, §2 Untersuchungsergebnisse) or in case of bacteriological isolation. Although detection can be done on a single animal, the epidemiological unit in tracing back and tracing on is the herd.

Diagnostic/analytical methods used

Periodical monitoring scheme: Routinely single serum samples or serum pools (5 sera in one pool) were tested in the Indirect-ELISA (I-ELISA) using the three OIE ELISA Brucella Standard Sera (OIE ELISAwpSS, OIE ELISAspSS, OIE ELISAnSS) and the OIE Brucella abortus Positive International Standard Antiserum (OIEISS) to calibrate the method (Commission Regulation 535/2002/EC of 21 March 2002 amending Annex C to Council Directive 64/432/EEC and amending Decision 2000/330/EC). Following a positive or suspected test result in the IELISA single serum samples were also tested in the Complement Fixation Test (CFT), Rose Bengal test (RBT) and Competitive ELISA (C-ELISA). Participation in international ring trials:
Brucellosis European Ring Trial 2000 and 2002 (VLA Weybridge) with ELISA, CFT, RBT and Serum Agglutination Test (SAT). The National Reference Laboratory for Brucellosis, Institute for Veterinary Disease Control in Moedling organized the national Brucellosis Ring Trials for all Veterinary Institutes.
Abortion or premature birth: Abortive material was tested bacteriologically and the cow that had an abort serologically as described above.
Bacteriology: Smears of the samples are stained by Stableforth´s method. Brucella agar and Columbia agar (Merck) containing selective additives were used (Oxoid). After inoculation the media were incubated for 4-10 days at 37°C in an atmosphere containing 10% CO2. The genus was identified by microscopic examination, catalase-, oxidase- and the slide agglutination test using brucella serum. The species was differentiated by CO2 requirement, H2S formation, urease activity, growth on media containing standard concentrations of basic fuchsin or thionin and agglutination with monospecific sera and by PCR (Real-time detection of Brucella abortus, Brucella melitensis and Brucella suis. 2001: Redkar et al., Mol Cell Probes. 2001 Feb;15(1):43-52.).

Vaccination policy

Vaccination is not allowed (BGBl. 1957/147, Bangseuchengesetz, § 13 Impfung)

Other preventive measures than vaccination in place

Periodical examinations, culling of reactors

Control program/mechanisms

The control program/strategies in place

Periodical monitoring scheme according the National Regulation BGBl 2003/526

(Bangseuchen-Untersuchungsverordnung 2004). Abortion or premature birth: Compulsory notification according BGBl 1957/147, Bangseuchengesetz, as amended, §11 Anzeigepflicht;
BGBl 1957/280, Bangseuchen-Verordnung, as amended, §9 Anzeigepflicht)

Recent actions taken to control the zoonoses

No actions, because OBF

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

According to BGBl 1957/147, Bangseuchengesetz, as amended, and BGBl 1909/177, Tierseuchengesetz, as amended

Notification system in place

Abortion or premature birth: Notification of abortions: The livestock owner has to notify each abortion within 24 hours to the mayor (Gemeinde). The mayor has to forward the notification to the local authority (Bezirksverwaltungsbehörde) (BGBl. 1957/147, Bangseuchengesetz, § 11 Anzeigepflicht). If the cow is under treatment of a veterinarian or the veterinarian has been informed about the abortion, the veterinarian has to notify to the official authority (Bezirksverwaltungsbehörde).

Results of the investigation

See tables

National evaluation of the recent situation, the trends and sources of infection

OBF

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

Nil

Additional information

Nil

B. Brucella melitensis in Sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Yes

Additional information

According to the Commission Decision Nr. 2001/292/EG Austria has the status officially brucellosis (B. melitensis) free (ObmF).

Monitoring system

Sampling strategy

To maintain the status officially brucellosis (B. melitensis) free, according to BGBl. 2002/184 (Brucella melitensis-Überwachungsverordnung, of 14 May 2002) representative samples had been examined with a confidence level of 95% to detect infected holdings at a target prevalence of 0.2 %. Sampling was performed by the competent authority or under its supervision, by bodies to which it had delegated this responsibility. Samples were taken in the holdings;
Abortion material and blood samples from the animal that had an abort were also investigated.

Frequency of the sampling

Principally the sampling was performed during the cold season, between January and May and in November and December when the animals were kept in the stables.

Type of specimen taken

Other: - ; Monitoring: Blood samples.

Methods of sampling (description of sampling techniques)

Individual blood samples and abortion material are taken in the holdings and sent to the laboratories.

Case definition

An animal is considered to be infected with B. melitensis in case of bacteriological isolation or positive serological test result.

Diagnostic/analytical methods used

- Routinely single serum samples were tested in the Indirect ELISA. Confirmation of suspected or positive results was performed by the Complement Fixation Test (CFT) with reference standard antisera from CVL-Weybridge. Participation in international ring trials: Brucellosis European Ring Trial 2000 and 2002 (VLA Weybridge) with ELISA, CFT, RBT and SAT. The National Reference Laboratory for Brucellosis, Institute for Veterinary Disease Control in Moedling organized the national Brucellosis Ring Trials for all national Veterinary
Institutes.
Bacteriology: Smears of the samples were stained by Stableforth´s method.
Brucella agar and Columbia agar (Merck) containing selective additives (Oxoid) were used. After inoculation the media are incubated for 4-10 days at 37°C in an atmosphere containing 10% CO2. The genus was identified by microscopic examination, catalase-,

oxidase- and the slide agglutination test using brucella serum. The species were differentiated by CO2 requirement, H2S formation, urease activity, growth on media containing standard concentrations of basic fuchsin or thionin and agglutination with monospecific sera and by PCR (Real-time detection of Brucella abortus, Brucella melitensis and Brucella suis. 2001: Redkar et al., Mol Cell Probes. 2001 Feb;15(1):43-52.).

Vaccination policy

According to BGBl. 2002/184 (Brucella melitensis-Überwachungsverordnung, of 14 May 2002, §4, Impfverbot) vaccination is not allowed.

Other preventive measures than vaccination in place

Monitoring program and investigation of aborts.

Control program/mechanisms

The control program/strategies in place

To maintain the status officially brucellosis (B. melitensis) free, according to BGBl. 2002/184 (Brucella melitensis-Überwachungsverordnung, of 14 May 2002) representative samples have to be examined with a confidence level of 95% to detect infected holdings at a prevalence of 0.2 %. Sampling is performed by the competent authority or under its supervision, by bodies to which it has delegated this responsibility. Samples are taken in the holdings;
Notification and clarification of each clinical case by bacteriology and serology

Recent actions taken to control the zoonoses

ObmF

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

According to BGBl. 2002/184 (Brucella melitensis-Überwachungsverordnung, of 14 May 2002, §3, Ausmerzung von Reagenten) reactors have to be culled, the carcasses have to be incinerated in an incineration plant.

Notification system in place

Notification of brucellosis or a suspicion of brucellosis according to BGBl. 2002/184 (Brucella melitensis-Überwachungsverordnung, of 14 May 2002.

Results of the investigation

See tables

National evaluation of the recent situation, the trends and sources of infection

ObmF

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

Nil

Additional information

Nil

C. Brucella melitensis in Goat

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Yes

Additional information

According to the Commission Decision Nr. 2001/292/EG Austria has the status officially brucellosis (B. melitensis) free (ObmF).

Monitoring system

Sampling strategy

To maintain the status officially brucellosis (B. melitensis) free, according to BGBl. 2002/184
(Brucella melitensis-Überwachungsverordnung, of 14 May 2002) representative samples have to be examined with a confidence level of 95% to detect infected holdings at a prevalence of 0.2 %. Sampling is performed by the competent authority or under its supervision, by bodies to which it has delegated this responsibility. Samples are taken in the holdings;
Abortion material and blood samples from the animal that had an abort were also investigated.

Frequency of the sampling

Principally the sampling was performed during the cold season, between January and May and in November and December when the animals were kept in the stables.

Type of specimen taken

Other: - ; Monitoring: Blood samples.

Methods of sampling (description of sampling techniques)

Individual blood samples and abortion material are taken in the holdings and sent to the laboratories.

Case definition

An animal is considered to be infected with B. melitensis in case of bacteriological isolation or positive CFT.

Diagnostic/analytical methods used

- Routinely single serum samples or serum pools (5 sera in one pool) are tested in the Indirect or Competitve ELISA. Confirmation of suspected or positive results is performed by the Complement Fixation Test (CFT) with reference standard antisera from CVLWeybridge.
Participation in international ring trials: Brucellosis European Ring Trial 2000 and 2002 (VLA Weybridge) with ELISA, CFT, RBT and SAT. The National Reference Laboratory for Brucellosis, Institute for Veterinary Disease Control in Moedling organizes the national Brucellosis Ring Trials for all Veterinary Institutes.
- Bacteriology: Smears of the samples were stained by Stableforth´s method; Brucella agar and Columbia agar (Merck) containing selective additives (Oxoid) were used. After inoculation the media are incubated for 4-10 days at 37°C in an atmosphere containing 10% CO2. The genus was identified by microscopic examination, catalase-, oxidase- and the slide agglutination test using brucella serum. The species were differentiated by CO2 requirement, H2S formation, urease activity, growth on media containing standard concentrations of basic fuchsin or thionin and agglutination with monospecific sera and by PCR (Real-time detection of Brucella abortus, Brucella melitensis and Brucella suis. 2001: Redkar et al., Mol Cell Probes. 2001 Feb;15(1):43-52.).

Vaccination policy

According to BGBl. 2002/184 (Brucella melitensis-Überwachungsverordnung, of 14 May 2002, §4, Impfverbot) vaccination is not allowed.

Other preventive measures than vaccination in place

Monitoring program and investigation of aborts.

Control program/mechanisms

The control program/strategies in place

To maintain the status officially brucellosis (B. melitensis) free, according to BGBl. 2002/184
(Brucella melitensis-Überwachungsverordnung, of 14 May 2002) representative samples have to be examined with a confidence level of 95% to detect infected holdings at a prevalence of 0.2 %. Sampling is performed by the competent authority or under its supervision, by bodies to which it has delegated this responsibility. Samples are taken in the holdings; Notification and clarification of each clinical case by bacteriology and serology.

Recent actions taken to control the zoonoses

ObmF

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

According to BGBl. 2002/184 (Brucella melitensis-Überwachungsverordnung, of 14 May 2002, §3, Ausmerzung von Reagenten) reactors have to be culled, the carcasses have to be incinerated in an incineration plant

Notification system in place

Notification of brucellosis or a suspicion of brucellosis according to BGBl. 2002/184 (Brucella melitensis-Überwachungsverordnung, of 14 May 2002.

Results of the investigation

See tables

National evaluation of the recent situation, the trends and sources of infection

ObmF

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

Nil

Additional information

Nil

D. B. suis in animal - Pigs

Monitoring system

Sampling strategy

Abort material and blood samples from pigs that had an abort are examined in veterinary laboratories.

Frequency of the sampling

Targeted, following abortion and in positive cases contact holdings.

Methods of sampling (description of sampling techniques)

Individual blood samples and abortion material are taken in the holdings and sent to the laboratories.

Case definition

An animal is considered to be serologically positive for brucellosis following one/more

positive CFT Complement Fixation Test (CFT) and RBT Rose Bengal test (RBT) results (B. abortus used antigen) or infected with B. suis in case of bacteriological isolation

Diagnostic/analytical methods used

- Due to the fact that a Brucella suis antigen is not available, the B. abortus antigen is used for the Complement Fixation Test (CFT) and the Rose Bengal test (RBT) because B. abortus shows cross reactions with B. suis antibodies.
- ELISA and CFT is not available, the B. abortus ELISA and CFT are used because these tests show cross reactions with B. suis antibodies.
- Participation in international ring trials: Brucellosis European Ring Trial 2000 and 2002 (VLA Weybridge) with ELISA, CFT, RBT and Serum Agglutination Test (SAT). The National Reference Laboratory for Brucellosis, Institute for Veterinary Disease Control in Moedling organized the national Brucellosis Ring Trials for all Veterinary Institutes.

Bacteriology: Quality control: Laboratory strains
- Smears of the samples are stained by Stableforth´s method
- Brucella agar and Columbia agar (Merck) containing selective additives (Oxoid) were used. After inoculation the media are incubated for 4-10 days at 37°C in an atmosphere containing 10% CO2. The genus was identified by microscopic examination, catalase-, oxidase- and the slide agglutination test using brucella serum. The species were differentiated by CO2 requirement, H2S formation, urease activity, growth on media containing standard concentrations of basic fuchsin or thionin and agglutination with monospecific sera and by PCR (Real-time detection of Brucella abortus, Brucella melitensis and Brucella suis. 2001: Redkar et al., Mol Cell Probes. 2001 Feb;15(1):43-52.).

Vaccination policy

Nil

Other preventive measures than vaccination in place

Nil

Control program/mechanisms

The control program/strategies in place

Nil

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

No mandatory measures but notification.

Notification system in place

B. suis is notifiable since 1993 according to BGBl 1993/756, Tierseuchen-Anzeigepflichtverordnung, as amended

Results of the investigation

Nil

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

Nil

Additional information

Nil

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk samples			Information about abortions			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbio logically	Number of animals positive microbio logically
																		Serologically	BST		
ÖSTERREICH	83138	2021901	83138	100	0	0	17796	205658	0	0	0	794	0	0	0	1	1	0	0	0	0
Total	83138	2021901	83138	100	0	0	17796	205658	0	0	0	794	0	0	0	1	1	0	0	0	0

Footnote

source of information: Central Veterinary Services

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

Region	Total number of existing ovine / caprine		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of animals	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of suspended herds
ÖSTERREICH	26354	380828	26352	100	2	0	1629	12350	2	31	8	8	0	2
Total	26354	380828	26352	100	2	0	1629	12350	2	31	8	8	0	2

Footnote

Source of information: Central Veterinary Services, Provincial Veterinary Services

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

History of the disease and/or infection in the country

Yersiniosis is not considered a major food borne illness in Austria. The incidence of human disease is low when compared to salmonellosis or campylobacteriosis.

National evaluation of the recent situation, the trends and sources of infection

In 2005 a total of 143 human infections were notified. 99 isolates from patients were sent to the National Reference Laboratory for Yersinia. The sources of infections are unclear. Neither studies on sporadic cases nor scientific outbreak investigations were performed in Austria so far.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

No valid data are available for animals and feedingstuffs. A total of 47 single food samples were tested for Yersinia spp. in 2005 with 2 samples (crustaceae and mixed minced meat) positive for Y. enterocolitica, 2 (meat from other animals and raw cows milk) positive for Y. intermedia.

Recent actions taken to control the zoonoses

None

Suggestions to the Community for the actions to be taken

Nil

Additional information

Nil

2.7.2. Yersinia in foodstuffs

A. Yersinia unspecified in food - All foodstuffs - Monitoring - official sampling

Monitoring system

Sampling strategy

No surveillance programmes are applied.
Foodstuff was sampled according to the Erlass der Bundesministerin für Gesundheit und Frauen: Revisions- und Probenplan für das Jahr 2004; Richtlinien über die Vollziehung der Überwachung des Verkehrs mit den durch das LMG 1975 erfassten Waren (GZ BMGF-75500/0087--IV/B/10/2004 of 23.12.2004). The Revision-Plan determines the number of food enterprises e.g. restaurants, dairies, retail etc. that have to be tested randomly per province according to the number of food enterprises per province. Each business has to be sampled at least once per year. The inspection can comprise sampling, hygienic investigations of the employees, checking of HACCP, control of manufacturing processes etc..
The sampling plan determines the number of samples of each class of goods, as raw meat, fresh or frozen; sausages; cheeses; milk; preserved food etc. that have to be investigated randomly.
Samples from suspected foodstuffs are taken following outbreak investigation, complaint, confiscation, violation etc.

Diagnostic/analytical methods used

Detection of Yersinia enterocolitica is performed according to ISO 10273:1994

Table Yersinia spp. in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Yersinia	Y. enterocolitica	Yersinia spp., unspecified	Y. intermedia	Y. enterocolitica - Y. enterocolitica O:3	Y. enterocolitica - Y. enterocolitica O:9
Meat from pig										
fresh	XVI)	single	1g	1	0					
minced meat	XV)	single	25g	2	0					
meat products	XVI)	single	1g	2	0					
Meat from bovine animals										
minced meat	XV)	single	25g	7	0					
Milk, cows'										
raw milk for manufacture										
intended for manufacture of raw or low heat-treated products	XVI)	single	1g	5	1			1		
Crustaceans										
unspecified										
raw	XVI)	single	1g	6	1	1				
Fish										
raw	XV)	single	25g	1	0					
Meat from other animal species or not specified										
meat products	XVI)	single	1g	2	1			1		
Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)										
minced meat	XV)	single	25g	21	1	1				

Footnote

XV) ILMU Salzburg, Linz XVI) ILMU Graz

2.7.3. Yersinia in animals

2.8. TRICHINELLOSIS

2.8.1. General evaluation of the national situation

A. Trichinellosis General evaluation

History of the disease and/or infection in the country

No documented human infections in 2005.

National evaluation of the recent situation, the trends and sources of infection

No documented human infections in 2005.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

No documented infections in food-animals in 2005.

Recent actions taken to control the zoonoses

No new measures implemented

Suggestions to the Community for the actions to be taken

Reconsider the necessity of routine trichinella meat inspection in pig carcasses

Additional information

Nil

2.8.2. Trichinella in animals

A. Trichinella in pigs

Monitoring system

Sampling strategy

General

Targeted sampling of all slaughtered except pigs slaughtered by the farmer for his own consumption (=hause-slaughtering); the sampling is performed by competent authorities and not stratified by geographical regions; the samples are taken at slaughterhouses; the sampling is part of a permanent monitoring scheme

Frequency of the sampling

General

Other: Permanent post-mortem sampling of each slaughtered pig

Type of specimen taken

General

Other: Muscles: Diaphragm (crus), tongue, masseter and abdominal muscles.

Methods of sampling (description of sampling techniques)

General

Appropriate muscle is excised out of the carcass.

Diagnostic/analytical methods used

General

According to the Manual of OIE-standards trichinelosis chapter 2.2.9; no modification);
- ; Compression method: Two muscles in a size of a haselnut where taken from the diaphragma of a slaughtered pig from both muscles 7 small parts in the size of a oatcorn will be investigated in the compressorium (=14 parts from the diaphragma of one pig);
- ; Digestion method: maximum 100 samples (=100 pigs) - 1g muscle per each sample, digestion with pepsin, water and hydrochloric acid, incubation about 30-60 min, sedimentation and investigation with a stereo- or trichinoscope.

Control program/mechanisms

The control program/strategies in place

Austrian post mortem meat inspection law for trichinosis (BGBl. 522/1982), RL 92/117/EWG,

RL 77/96/EWG

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

According to BGBl 1982/522, Fleischuntersuchungsverordnung, as amended and BGBl 1994/395, Fleischuntersuchungsverordnung, as amended: The carcass is unfit for human consumption and must be removed. If trichinosis was detected using the digestion method and the carcass infected with trichinella cannot be identified, after cold treatment applied to all carcasses pooled in the sample their meat is fit for human consumption.

Notification system in place

According to BGBl 1994/395, §10 (8), Fleischuntersuchungsverordnung, as amended: The competent authority has to notify the finding to the local authority and to the office of the provincial government responsible for the holding, from which the trichnellosis-positive animal was originated.

Results of the investigation including description of the positive cases and the verification of the Trichinella species

No findings in slaughtered pigs

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

Nil

Additional information

Nil

B. Trichinella in horses

Monitoring system

Sampling strategy

Targeted sampling of all slaughtered horses; the sampling is performed by competent authorities and not stratified by geographical regions; samples are taken at slaughterhouses; the sampling is part of a permanent monitoring scheme.

Frequency of the sampling

Other: Permanent post-mortem sampling of each slaughtered horse

Type of specimen taken

Other: Muscles from tongue, masseter, diaphragm and neck.

Methods of sampling (description of sampling techniques)

Appropriate muscle is excised out of the carcass.

Case definition

When trichinosis is detected with one of the given methods

Diagnostic/analytical methods used

According to the Manual of OIE-standards trichinelosis chapter 2.2.9; no modification).
- ; Compression method: Two muscles in a size of a haselnut where taken from the diaphragma of a slaughtered horse from both muscles 7 small parts in the size of a oatcorn will be investigated in the compressorium (=14 parts from the diaphragma of one horse);
- ; Digestion method: maximum 100 samples (=100 horses)- 1g muscle per each sample, digestion with pepsin, water and hydrochloric acid, incubation about 30-60 min, sedimentation and investigation with a stereo- or trichinoscope.

Control program/mechanisms

The control program/strategies in place

Austrian post mortem meat inspection law for trichinosis (BGBl. 522/1982), RL 92/117/EWG, RL 77/96/EWG

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

According to BGBl 1982/522, Fleischuntersuchungsverordnung, as amended and BGBl 1994/395, Fleischuntersuchungsverordnung, as amended: The carcass is unfit for human consumption and must be removed. If trichinosis was detected using the digestion method and the carcass infected with trichinella cannot be identified, after cold treatment applied to all carcasses pooled in the sample their meat is fit for human consumption.

Notification system in place

According to BGBl 1994/395, §10 (8), Fleischuntersuchungsverordnung, as amended: The competent authority has to notify the finding to the local authority and to the office of the provincial government responsible for the holding, from which the trichnellosis-positive animal was originated.

National evaluation of the recent situation, the trends and sources of infection

Nil

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

Nil

Additional information

Nil

C. Trichinella spp., unspecified in animal - Wild boars

Monitoring system

Sampling strategy

Sampling of all hunted or harvested wild boars; the sampling is performed by hunters with special knowledge about trichnella investigation or by competent authorities; the sampling is stratified by geographical regions depending to the habitats of wild boar in Austria; samples are taken after shouting or at the cold storage depots; the sampling is part of a monitoring scheme

Frequency of the sampling

All farmed wild boars are controlled for trichinella; only about 50% of all free-living Austrian wild boars (1998-2000) were investigated for trichinella parasites

Type of specimen taken

Other: Diaphragm muscles (crus), tongue, masseter and abdominal muscles

Methods of sampling (description of sampling techniques)

Appropriate muscle is excised out of the carcass.

Case definition

When trichinosis is detected with one of the given methods

Diagnostic/analytical methods used

According to the Manual of OIE-standards trichinelosis chapter 2.2.9; no modification)
- ; Compression method: Farmed and free-living wild boars: pieces from muscles in a size of a haselnut where taken from the tongue, diaphragma, masseter, forearm and intercostals part from all muscles 28 small parts in summary in the size of a oatcorn should be investigated in the compressorium.
- ; Digestion method: Farmed and free-living wild boars-maximum 100 samples (=100 wild boars)- 1g muscle per each sample, digestion with pepsin, water and hydrochloric acid, incubation about 30-60 min, sedimentation and investigation with a stereo- or

trichinoscope.

Control program/mechanisms

The control program/strategies in place

Austrian post mortem meat inspection law for trichinosis (BGBl. 522/1982), RL 92/117/EWG, RL 77/96/EWG

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

According to BGBl 1982/522, Fleischuntersuchungsverordnung, as amended and BGBl 1994/395, Fleischuntersuchungsverordnung, as amended: The carcass is unfit for human consumption and must be removed.

Notification system in place

According to BGBl 1994/395, §10 (8), Fleischuntersuchungsverordnung, as amended: The competent authority has to notify the finding to the local authority and to the office of the provincial government responsible for the holding, from which the trichnellosis-positive animal was originated.

Results of the investigation including the origin of the positive animals

No findings in wild boars.

National evaluation of the recent situation, the trends and sources of infection

Nil

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

Nil

Additional information

Nil

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total animals positive for Trichinella	T. spiralis	Trichinella spp., unspecified
Pigs	VII)	Animal	5.240.966	0		
Solipeds, domestic						
horses	VII)	Animal	1.029	0		
Wild boars						
wild	VIII)	Animal	3.713	0		
farmed	VII)	Animal	955	0		

Footnote

VII) Central Veterinary Services, Federal Ministry of Health and Women; Statistics Austria VIII) National Reference Laboratory for Trichinella in Animals

2.9. ECHINOCOCCOSIS

2.9.1. General evaluation of the national situation

A. Echinococcus spp general evaluation

History of the disease and/or infection in the country

Austria is a low risk country for both forms of echinococcosis

National evaluation of the recent situation, the trends and sources of infection

We expect the prevalence to be low also in future. We see approx. 1-2 human cases of Echinococcus multilocularis infestation in Austria per year; in 2005 there were even 31 patients with the large majority of cases who acquired the cystic infection during childhood in countries like former Jugoslawia or Turkey (in 2005: 29 imported cases). 3 cases of alveolar echinococcosis were probable autochtone cases.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Alveolar echinococcosis: Due to the infection rates of red foxes in Austria (0-40 %) there is a relatively elevated risk for hunters, cat owners and farmers. Austrian sheep are no relevant source for cystic echinococcosis in Austrian patients.

Recent actions taken to control the zoonoses

Tools for preventive serological screening of hunters (and also other persons) have been established to detect Echinococcus multilocularis infections in an early stage. The early detection of the infection is the prerequisite for a successful curative treatment.

Suggestions to the Community for the actions to be taken

Nil

Additional information

Nil

2.9.2. Echinococcus in animals

A. E. multilocularis in animal - Wildlife - foxes

Monitoring system

Sampling strategy

Foxes that were sent to the laboratory for rabies testing were investigated on request of the sender for Echinococcus multilocularis.

Frequency of the sampling

The sampling was done over the year.

Methods of sampling (description of sampling techniques)

The fox's carcasses were sent to the laboratory and frozen for 14 days at -80°C.

Case definition

Identification of the small tapeworm in the small intestine of foxes

Vaccination policy

No vaccination

Other preventive measures than vaccination in place

Nil

Control program/mechanisms

The control program/strategies in place

There are no programs in place except individual scientific studies.

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

We would appreciate a permanent monitoring in Austria similar to the rabies investigations. Even the logistic problems would be solved when combining rabies and Echinococcus multilocularis - monitoring. Still money would be needed to establish a routine monitoring for Echinococcus multilocularis.

Measures in case of the positive findings or single cases

Persons, who handled with positive foxes, were informed about the test results in the foxes and contact addresses of human laboratories for echinococcosis diagnosis were provided. These persons were tested for free.

Notification system in place

None

National evaluation of the recent situation, the trends and sources of infection

The national evaluation about the burden of infection for humans is in progress based on retrospective and recent data

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

Yet there is too little known about the infection chain to humans. It is assumed that collecting contaminated food (berries, mushrooms) is a possibility to achieve an infection but there is no proofed evidence or correlation between prevalence in foxes and human cases.

Additional information

Nil

B. Echinococcus spp., unspecified in animal

Monitoring system

Sampling strategy

Targeted sampling of all in abattoirs slaughtered animals; the sampling is performed by competent authorities in course of the post-mortem meat inspection; the sampling is part of a permanent monitoring scheme.

Frequency of the sampling

Permanent post-mortem sampling of each slaughtered animal

Methods of sampling (description of sampling techniques)

All organs and muscles that were used for human consumption

Case definition

Each carcass in which cystic or alveolar hydatids are detected in muscles or organs

Vaccination policy

No vaccination

Other preventive measures than vaccination in place

No measures

Control program/mechanisms

The control program/strategies in place

Post mortem meat inspection act according to BGBl. 1982/522, Fleischuntersuchungsgesetz, as amended

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

According to BGBl 1982/522, Fleischuntersuchungsverordnung, as amended and BGBl 1994/395, Fleischuntersuchungsverordnung, as amended: The carcass is unfit for human consumption and must be removed.

Notification system in place

According to BGBl 1994/395, §10 (8), Fleischuntersuchungsverordnung, as amended: The competent authority has to notify the finding to the local authority.

National evaluation of the recent situation, the trends and sources of infection

In 2005 no case was detected in the post-mortem inspection. In 1 out of 19 examined foxes E. multilocularis was found.

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

Cystic or alveolar echinococcosis in animals that are used for food production do not play a role for the infection of humans; it is primarily a hygienic problem. Only when infected waste from animals is used as feed for carnivores the risk of infection for humans increases.

Additional information

Nil

Table Echinococcus spp. in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals)	VII)	Animal	565698	0			
Sheep	VII)	Animal	295061	0			
Goats	VII)	Animal	50564	0			
Pigs	VII)	Animal	5240966	0			
Solipeds, domestic	VII)	Animal	1029	0			
Foxes	VI)	Animal	19	1		1	

Footnote

VI) Institute of Parasitology and Zoology, Department for Pathobiology, University of Veterinary Medicine, Vienna VII) Central Veterinary Services, Federal Ministry of Health and Women

2.10. TOXOPLASMOSIS

2.10.1. General evaluation of the national situation

A. Toxoplasmosis general evaluation

History of the disease and/or infection in the country

No data available

2.10.2. Toxoplasma in animals

2.11. RABIES

2.11.1. General evaluation of the national situation

A. Rabies General evaluation

History of the disease and/or infection in the country

Rabies in humans was a major public health issue in the 1960s.

National evaluation of the recent situation, the trends and sources of infection

In 2005 there was no case in Austria.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Nil

Recent actions taken to control the zoonoses

In 2005 there was still vaccination programs carried out.

Suggestions to the Community for the actions to be taken

Nil

Additional information

Nil

2.11.2. Lyssavirus (rabies) in animals

A. Rabies virus in animal - Wildlife - foxes

Monitoring system

Sampling strategy

According to (GZ:39.642/14-VII/B/03): 8 foxes per 100km² in rabies infested and rabies endangered areas, 4 foxes per 100km² in not endangered and free areas (definition of areas: GZ 30.517/35-IV/12/03).

Frequency of the sampling

8 foxes per 100 km² in rabies infested and rabies endangered areas, 4 foxes per 100km² in not endangered and free areas.

Methods of sampling (description of sampling techniques)

Whole animals or heads of the dead animals are sent to the laboratories; sometimes brain tissue (derived from other laboratories). Brain-Tissue (e.g. 1 cm2) is examined.

Case definition

An animal is considered positive if the fluorescent antibody test (FAT) shows a positive signal.

Diagnostic/analytical methods used

- ; The routine test was the fluorescent antibody test (FAT).
- ; RTCIT (rabies tissue culture infection test) was performed on mouse neuroblastoma cells.
- ; The MIT (mouse inoculation test) was used to confirm positive findings

Vaccination policy

Oral vaccination of foxes twice a year according to GZ: 30.517/52-IV/12/03

Other preventive measures than vaccination in place

No measures

Control program/mechanisms

The control program/strategies in place

- ; Fuchs-Tollwutbekämpfungsverordnung BGBl II 2001/75, Tierseuchengesetz TSG RGBl 1909/177 as amended, BGBl I 2002/65 IV. Abschnitt, §41, §42, Tierseuchengesetz-Durchführungsverordnung 1909/178 as amended: BGBl 1955/76 TSG-DVO zum IV. Abschnitt Wutkrankheiten
- ; Control of vaccination: Detection of tetracycline in jaw bones of randomly chosen fox from the vaccination area

Recent actions taken to control the zoonoses

In 2004 there were still vaccination programmes carried out (due to rabies in fox in 2003).

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

Tierseuchengesetz TSG RGBl 1909/177 as amended, BGBl I 2002/65 IV. Abschnitt, §41, §42, and vaccination of the Fox Population

Notification system in place

According to Tierseuchengesetz TSG RGBl 1909/177 as amended, BGBl I 2002/65 IV. Abschnitt, §41, §42

Results of the investigation

Nil

National evaluation of the recent situation, the trends and sources of infection

The virus isolated from a dead fox was not a wild rabies strain, but a vaccination strain. It is well known that vaccination of fox populations can cause lethality in very young animals.

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

Nil

B. rabies virus in animal - All animals (except foxes)

Monitoring system

Sampling strategy

Sampling is targeted when animals are observed with central nervous symptoms or after biting a person. The suspicious animal is killed or euthanized and the carcasses or heads sent to the laboratory.

Frequency of the sampling

In case of suspicion

Methods of sampling (description of sampling techniques)

Routinely there will be taken one site from the brain either a part from the amon´s horn, brain stem or cerebellum. If an animal has bitten a person then 2 sites from the brain will be taken: ammon´s horn and brain stem.

Case definition

An animal is considered positive if the fluorescent antibody test (FAT) or the rabies tissue culture infection test or the mouse inoculation test reveal a positive result.

Diagnostic/analytical methods used

- ; The routine test was the fluorescent antibody test (FAT).
- ; RTCIT (rabies tissue culture infection test) was performed on mouse neuroblastoma cells.
- ; The MIT (mouse inoculation test) was used to confirm positive findings

Vaccination policy

Voluntary vaccination of pets.

Other preventive measures than vaccination in place

No measures

Control program/mechanisms

The control program/strategies in place

Tierseuchengesetz TSG RGBl 1909/177 as amended, BGBl I 2002/65 IV. Abschnitt, §41, §42; Tierseuchengesetz-Durchführungsverordnung 1909/178 as amended: BGBl 1955/76

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Measures in case of the positive findings or single cases

Tierseuchengesetz TSG RGBl 1909/177 as amended, BGBl I 2002/65 IV. Abschnitt, §41, §42. If a rabies suspicious pet bites a person, the person is treated.

Notification system in place

According to Tierseuchengesetz TSG RGBl 1909/177 as amended, BGBl I 2002/65 IV. Abschnitt, §41, §42

National evaluation of the recent situation, the trends and sources of infection

Nil

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

Nil

Additional information

Nil

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	unspecified Lyssavirus
Cattle (bovine animals)	III)	Animal	12	0	
Sheep	III)	Animal	2	0	
Solipeds, domestic	III)	Animal	2	0	
Dogs	III)	Animal	87	0	
Cats	III)	Animal	115	0	
Bats					
wild	III)	Animal	2	0	
Foxes					
wild	III)	Animal	8706	0	
Badgers					
wild	III)	Animal	160	0	
Marten					
wild	III)	Animal	883	0	
Wild boars					
wild	III)	Animal	3	0	
Deer					
wild					
roe deer	III)	Animal	43	0	
Other animals	III)	Animal	41	0	
Other mustelides	III)	Animal	30	0	

Footnote

III) AGES Institute for Veterinary Disease Control Moedling

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ESCHERICHIA COLI, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

A. E. coli general evaluation

History of the disease and/or infection in the country

Resistance monitoring was started in Austria in 2004 and continued in 2005.

National evaluation of the recent situation, the trends and sources of infection

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

Recent actions taken to control the zoonoses

The Austrian wide monitoring program on the trends of antimicrobial resistance of E. coli in poultry, bovine animals and pigs was implemented according to the directive 2003/99/EC of the European Parliament and the Council of 17 November 2003 in the National Order GZ: BMGF-74600/0092-IV/B/8/2005 (Überwachungsprogramme 2005 zu ausgewählten Zoonosen und Antibiotikaresistenzen). The sampling was carried out from 30 May to 2 December 2005 and follow up programs will be realised in the forthcoming years.

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for antimicrobial resistance monitoring would be highly welcome.

Additional information

Nil

3.1.2. Antimicrobial resistance in Escherichia coli, non-pathogenic isolates

A. Antimicrobial resistance of E. coli in animal - Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling

Sampling strategy used in monitoring

Frequency of the sampling

Monitoring program on the occurrence and trend of antimicrobial resistance in E. coli based on the prevalence of E. coli in slaughtered animals: At an estimated percentage of resistance in antimicrobials of 27% and a desired accuracy of 5% for a confidence level of 95%, 300 isolates of E. coli from bovine animals were required.
To obtain this number of isolates, as sample size, 325 slaughtered bovine animals had to be tested, calculated on approximately 664.000 slaughtered bovine animals in 2003 in Austria, with an estimated prevalence of E. coli of 92.4% based on the results from the monitoring in 2004, and at a desired accuracy of 5% for a confidence level of 95%. The sampling had been stratified on the number of slaughtering by abattoirs all over Austria but not on time. The sampling was equally distributed over the period of the study.
In Austria, all 68 abattoirs in which more than 500 bovine animals were slaughtered in 2004 accounted for approximately 83% of the total annual bovine production. Sampling was performed in 48 of the 68 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 20 samples were distributed over the 48 abattoirs.

Type of specimen taken

Colon containing 50 to 100 grams of faeces.

Methods of sampling (description of sampling techniques)

The sampling was performed by official veterinarians carrying out the post-mortem inspection. At time of evisceration a part of the colon was ligated and wrapped in a sterile plastic bag. After cooling down to 4°C the sample was sent in a hobbock or polystyrene box after adding cooling units to the locally appropriate Institute of Veterinary Diseases Control (IVET). In the laboratory some content of each colon was plated on selective medium suitable for E. coli.

Procedures for the selection of isolates for antimicrobial testing

All 294 E. coli isolated from bovine animals were sent to the IVET in Innsbruck where the antimicrobial susceptibility testing of all isolates of E. coli were performed.

Laboratory methodology used for identification of the microbial isolates

E. coli colonies were identified after isolation on MacConkey plates and subculture on Columbia sheep blood agar plates by oxidase and spot indole test. All E. coli isolates were frozen in proteose pepton solution containing 10% glycerol at -70°C. The susceptibility testing

was done with Sensititre® Microbiology Systems (MCS Diagnostics). The frozen E. coli were subcultivated on Columbia agar (Oxoid) and incubated 24 hours at 37°C. 3-5 colonies were suspended in physiological NaCl solution and adjusted to a McFarland of 0.5. 10 µl of the suspension was inoculated in 10 ml Mueller Hinton bouillon and incubated 24 hours at 37°C. MIC values have been entered in a Microsoft® Excel datasheet.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was done with Sensititre® Microbiology Systems (MCS Diagnostics).
The frozen enterococci were subcultivated on Columbia agar (Oxoid) and incubated 24 hours at 37°C. 3 - 5 colonies were suspended in physiological NaCl solution and adjusted to a McFarland of 0.5. 10µl of the suspension was inoculated into 10 ml Mueller Hinton bouillon and incubated 24 hours at 37°C.
MIC values have been entered in a Microsoft® Excel datasheet.

Control program/mechanisms

The control program/strategies in place

Samples from food animals were monitored for antimicrobial residues according to a randomized sampling scheme (BMGF-74320/0003-IV/B/7/2005, Rückstandsuntersuchung-Durchführungserlass 2005)

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for antimicrobial resistance monitoring would be highly welcome.

National evaluation of the recent situation, the trends and sources of infection

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

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

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

Additional information

Nil

B. Antimicrobial resistance of E. coli in animal - Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling

Sampling strategy used in monitoring

Frequency of the sampling

Monitoring program on the occurrence and trend of antimicrobial resistance in E. coli based on the prevalence of E. coli in slaughtered animals: At an estimated percentage of resistance in antimicrobials of 27% and a desired accuracy of 5.5% for a confidence level of 95%, 249 isolates of E. coli from pigs were required.
To obtain this number of isolates, as sample size, 265 slaughtered pigs had to be tested, calculated on approximately 4,700,00 slaughtered pigs in 2003 in Austria, with an estimated prevalence of E. coli of 93.8%, based on the results from the monitoring in 2004, and at a desired accuracy of 5% for a confidence level of 95%. The sampling had been stratified on the number of slaughtering by abattoirs all over Austria but not on time. The sampling was equally distributed over the period of the study.
In Austria, all 73 abattoirs in which more than 3,500 pigs were slaughtered in 2003 accounted for approximately 90% of the total annual pig production. Sampling was performed in 48 of the 73 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 25 samples were distributed over the 48 abattoirs.

Type of specimen taken

Colon containing 50 to 100 grams of faeces.

Methods of sampling (description of sampling techniques)

The sampling was performed by official veterinarians carrying out the post-mortem inspection. At time of evisceration a part of the colon was ligated and wrapped in a sterile plastic bag. After cooling down to 4°C the sample was sent in a hobbock or polystyrene box after adding cooling units to the locally appropriate Institute of Veterinary Diseases Control (IVET). In the laboratory some content of each colon was plated on selective medium suitable for E. coli.

Procedures for the selection of isolates for antimicrobial testing

All 236 E. coli isolated from pigs were sent to the IVET in Innsbruck where the antimicrobial susceptibility testing of all isolates of E. coli were performed.

Laboratory methodology used for identification of the microbial isolates

E. coli colonies were identified after isolation on MacConkey plates and subculture on Columbia sheep blood agar plates by oxidase and spot indole test.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

All E. coli isolates were frozen in proteose pepton solution containing 10% glycerol at -70°C.
The susceptibility testing was done with Sensititre® Microbiology Systems (MCS Diagnostics). The frozen E. coli were subcultivated on Columbia agar (Oxoid) and incubated 24 hours at 37°C. 3-5 colonies were suspended in physiological NaCl solution and adjusted to a McFarland of 0.5. 10 µl of the suspension was inoculated in 10 ml

Mueller Hinton bouillon and incubated 24 hours at 37°C.
MIC values have been entered in a Microsoft® Excel datasheet.

Control program/mechanisms

The control program/strategies in place

Samples from food animals were monitored for antimicrobial residues according to a randomized sampling scheme (BMGF-74320/0003-IV/B/7/2005, Rückstandsuntersuchung-Durchführungserlass 2005).

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for antimicrobial resistance monitoring would be highly welcome.

National evaluation of the recent situation, the trends and sources of infection

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

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

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

Additional information

Nil

C. Antimicrobial resistance of E. coli in animal - Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling

Sampling strategy used in monitoring

Frequency of the sampling

Monitoring program on the occurrence and trend of antimicrobial resistance in E. coli based on the prevalence of E. coli in slaughter batches: At an estimated percentage of resistance in antimicrobials of 20% and a desired accuracy of 5% for a confidence level of 95%, 117 isolates of E. coli from poultry were required.
To obtain this number of isolates, as sample size, 120 slaughter batches of poultry had to be tested, calculated on approximately more than 10,000 slaughter batches of poultry in 2003 in Austria, with an estimated prevalence of E. coli of 97.2%, based on the results from the monitoring in 2004, and at a desired accuracy of 5% for a confidence level of 95%. Caeca of 10 animals, as the secondary sample size, had to be collected. The secondary sample size gives the number of birds per batch to be sampled and had been computed on slaughter batches of more than 2000 broilers, an expected prevalence of 30% within the batch and a confidence level of 95%. The sampling had been stratified on

the number of slaughter batches by slaughter plants all over Austria but not on time. The sampling was equally distributed over the period of the study.
Sampling was performed in the 8 poultry slaughter plants with slaughter batches consisting of >2000 animals in Austria in 2003. The 8 slaughter plants included in the monitoring program accounted for almost 100% of broilers and turkeys of the total production in Austria.

Type of specimen taken

The whole intestines of 10 animals

Methods of sampling (description of sampling techniques)

The sampling was performed by official veterinarians carrying out the post-mortem inspection. At time of evisceration the whole intestines of 10 animals were taken and wrapped in a sterile plastic bag. After cooling down to 4°C the sample was sent in a hobbock or polystyrene box after adding cooling units to the locally appropriate Institute of Veterinary Diseases Control (IVET). In the laboratory a caecum of each intestinal convolute was identified, some content of each caecum pooled and plated on selective medium suitable for E. coli.

Procedures for the selection of isolates for antimicrobial testing

All 118 E. coli isolated from poultry flocks were sent to the IVET in Innsbruck where the antimicrobial susceptibility testing of all isolates of E. coli were performed.

Laboratory methodology used for identification of the microbial isolates

E. coli colonies were identified after isolation on MacConkey plates and subculture on Columbia sheep blood agar plates by oxidase and spot indole test.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

All E. coli isolates were frozen in proteose pepton solution containing 10% glycerol at -70°C.
The susceptibility testing was done with Sensititre® Microbiology Systems (MCS Diagnostics). The frozen E. coli were subcultivated on Columbia agar (Oxoid) and incubated 24 hours at 37°C. 3-5 colonies were suspended in physiological NaCl solution and adjusted to a McFarland of 0.5. 10 µl of the suspension was inoculated in 10 ml Mueller Hinton bouillon and incubated 24 hours at 37°C.
MIC values have been entered in a Microsoft® Excel datasheet.

Control program/mechanisms

The control program/strategies in place

Samples from food animals were monitored for antimicrobial residues according to a randomized sampling scheme (BMGF-74320/0003-IV/B/7/2005, Rückstandsuntersuchung-Durchführungserlass 2005).

Suggestions to the Community for the actions to be taken

Europe wide harmonized standards for antimicrobial resistance monitoring would be highly welcome.

National evaluation of the recent situation, the trends and sources of infection

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

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

Data of analysis have just been finalised therefor the interpretation of these results is still in progress.

Additional information

Nil

Table Antimicrobial susceptibility testing of E. coli in Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	E. coli Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	284

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	284	42							223	12	7	3	9	30								
Amphenicols																						
Chloramphenicol	284	3							7	105	162	7			3							
Florfenicol	284	0							8	124	147	5										
Cephalosporins																						
Cephalothin	284	12							1	21	149	101	10	1	1							
Ceftiofur	284	0					282		2													
Fluoroquinolones																						
Ciprofloxacin	284	0	273	9	1	1																
Quinolones																						
Nalidixic acid	284	3									279	2	1		2							
Trimethoprim	284	13								270	1	2	1	10								
Sulfonamides																						
Sulfamethoxazol	284	37												242	2	3	2		35			
Aminoglycosides																						
Streptomycin	284	32								172	69	11	10	4	18							
Gentamicin	284	0						276	8													
Neomycin	284	5							272	7			2	3								
Apramycin	284	1								280	3	1										
Spectinomycin	284	14									43	208	13	6	8	6						
Penicillins																						
Amoxicillin/Clavulanic acid	284	1							49	187	42	5		1								

Ampicillin	284	17						4	100	152	10	1	1	16										
Polymyxins																								
Colistin	284	1								282	1	1												

Table Antimicrobial susceptibility testing of E. coli in Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	E. coli
	Pigs - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	226

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	226	135							80	8	3	3	22	110								
Amphenicols																						
Chloramphenicol	226	6							5	80	131	4	1		5							
Florfenicol									12	104	106	3		1								
Cephalosporins																						
Cephalothin	226	10							4	30	112	70	9		1							
Ceftiofur	226	0					225	1														
Fluoroquinolones																						
Ciprofloxacin	226	3	214	4	2	1	1	1			3											
Quinolones																						
Nalidixic acid	226	8									214	4		2	2	4						
Trimethoprim	226	299								196	1		2	27								
Sulfonamides																						
Sulfamethoxazol	226	78												147	1		2	1	75			
Aminoglycosides																						
Streptomycin	226	128								55	33	10	31	49	48							
Gentamicin	226	0						215	8	3												
Neomycin	226	7							212	7		2	5									
Apramycin	226	1								216	9	1										
Spectinomycin	226	88									15	107	9	7	51	37						
Penicillins																						
Amoxicillin/Clavulanic acid	226	0							65	127	28	6										
Ampicillin	226	23						14	90	92	6	1	1	22								
Polymyxins																						


Colistin
226
0
224
2

Table Antimicrobial susceptibility testing of E. coli in Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	E. coli Gallus gallus (fowl) and turkeys - at slaughterhouse - animal sample - faeces - Monitoring - monitoring survey - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	128

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	128	42							82	2	2	4	3	35								
Amphenicols																						
Chloramphenicol	128	4							3	55	60	6			4							
Florfenicol	128	1							9	52	59	7	1									
Cephalosporins																						
Cephalothin	128	6							3	25	46	48	6									
Ceftiofur	128	0					128															
Fluoroquinolones																						
Ciprofloxacin	128	5	78	5	13	19	4	4		2	3											
Quinolones																						
Nalidixic acid	128	49									79		3	6	12	28						
Trimethoprim	128	18								110				18								
Sulfonamides																						
Sulfamethoxazol	128	30												98					30			
Aminoglycosides																						
Streptomycin	128	40								54	26	8	17	5	18							
Gentamicin	128	0						123	4	1												
Neomycin	128	8							120			1	3	4								
Apramycin	128	0								124	4											
Spectinomycin	128	11									24	85	7	1	6	5						
Penicillins																						
Amoxicillin/Clavulanic acid	128	0							47	55	24	2										

	128	24	10	52	39	3	24
Ampicillin							
Polymyxins							
Colistin	128	0			127	1	

Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates

	E. coli									
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**		**Gallus gallus (fowl) and turkeys**	
Isolates out of a monitoring programme	yes		yes						yes	
Number of isolates available in the laboratory	284		226						128	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines										
Tetracyclin	284	42	226	135					128	42
Amphenicols										
Chloramphenicol	284	3	226	6					128	4
Florfenicol	284	0	226	1					128	1
Cephalosporins										
Cephalothin	284	12	226	10					128	6
Ceftiofur	284	0	226	0					128	0
Fluoroquinolones										
Ciprofloxacin	284	0	226	3					128	5
Quinolones										
Nalidixic acid	284	3	226	8					128	49
Trimethoprim	284	13	226	29					128	18
Sulfonamides										
Sulfamethoxazol	284	37	226	78					128	30
Aminoglycosides										
Streptomycin	284	32	226	128					128	40
Gentamicin	284	0	226	0					128	0
Neomycin	284	5	226	7					128	8
Apramycin	284	1	226	1					128	0
Spectinomycin	284	14	226	88					128	11
Penicillins										
Amoxicillin/Clavulanic acid	284	1	226	0					128	0
Ampicillin	284	17	226	23					128	24
Polymyxins										
Colistin	284	1	226	0					128	0
Fully sensitive	284	222	226	61					128	44
Resistant to 1 antimicrobial	284	21	226	30					128	27
Resistant to 2 antimicrobials	284	8	226	31					128	19
Resistant to 3 antimicrobials	284	7	226	38					128	13
Resistant to 4 antimicrobials	284	13	226	33					128	9
Resistant to >4 antimicrobials	284	13	226	33					128	16

Table Breakpoints used for antimicrobial susceptibility testing of E. coli in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin	NCCLS			8	2	32				
Amphenicols										
Chloramphenicol	NCCLS			16	2	64				
Florfenicol	NCCLS			16	2	64				
Cephalosporins										
Cephalothin	NCCLS			16	2	64				
Ceftiofur	NCCLS			4	0,5	8				
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin	NCCLS			2	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	NCCLS			16	8	128				
Trimethoprim	NCCLS			8	4	32				
Sulfonamides										
Sulfonamide										
Sulfamethoxazol	NCCLS			256	64	1024				
Aminoglycosides										
Streptomycin	NCCLS			16	4	64				
Gentamicin	NCCLS			8	1	32				
Neomycin	NCCLS			8	2	32				
Kanamycin										
Apramycin	NCCLS			8	4	64				
Spectinomycin	NCCLS			64	4	128				
Trimethoprim + sulfonamides										
Penicillins										
Amoxicillin/Clavulanic acid	NCCLS			16	2	32				
Ampicillin	NCCLS			16	1	32				
Polymyxins										
Colistin	NCCLS			8	4	64				

4. FOODBORNE OUTBREAKS

Foodborne outbreaks are incidences of two or more human cases of the same disease or infection where the cases are linked or are probably linked to the same food source. Situation, in which the observed human cases exceed the expected number of cases and where a same food source is suspected, is also indicative of a foodborne outbreak.

A. Foodborne outbreaks

System in place for identification, epidemological investigations and reporting of foodborne outbreaks

Presently, the individual district (Austria = 98 + Vienna) is responsible for outbreak investigation. Food borne outbreaks affecting more than one district or even more than one province (Austria = 9) pose challenges concerning responsibility for outbreak investigation. A new national law (Zoonosengesetz, BGBl. I, 128/2005 entered into force on 1. January 2006) will clarify responsibilities.

Description of the types of outbreaks covered by the reporting:

Since a coordinated approach for outbreak investigation is still missing in most provinces, the large majority (541 of 606) of food borne outbreaks are called family- or household outbreaks. A coordinated Austrian wide outbreak investigation - not hampered by district limits - will drastically decrease the total number of outbreaks.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

In 2005, 606 food borne outbreaks have been reported with 1910 people diseased, 368 people hospitalized and 1 case as lethal; this is an increase of 12.4 % in the number of outbreaks compared to 2004. 7.6 % of the reported outbreaks were acquired abroad. 22.9 % of all in Austria acquired food borne outbreaks was caused by Campylobacter spp. (n = 128), 76.3 % by Salmonella spp. (n = 427) and 86.0 % of these by the serotype Enteritidis (n = 367).

Relevance of the different causative agents, food categories and the agent/food category combinations

Salmonella and Campylobacter pose the most important agents. The data quality does presently not allow conclusions on the relevance of different food categories.

Relevance of the different type of places of food production and preparation in outbreaks

The data quality does presently not allow conclusions on the relevance of different food categories.

Evaluation of the severity and clinical picture of the human cases

The data quality does presently not allow conclusions on the relevance of different food categories. Neither hospitalization nor lethality is presently ascertained in a valid way: Nevertheless, 19.3 % of patients affected by the reported food borne outbreaks are reported as hospitalized and 1 case as lethal.

Descriptions of single outbreaks of special interest

Pichler et al. (2005) Salmonella Enteritidis Phagentyp 5a Ausbruch, Österreich 2005. Mitteilungen der Sanitätsverwaltung 9/2005: 9-14.
Schmid et al. (2006) Salmonella Enteritidis phage type 21 outbreak in Austria, 2005, Euro Surveill 2006;11(2)

Control measures or other actions taken to improve the situation

A new national law (Zoonosengesetz, BGBl. I, 128/2005 entered into force on 1. January 2006) will clarify responsibilities.

Suggestions to the community for the actions to be taken

Nil

Additional information

Nil

Table 12. Foodborne outbreaks in humans

Causative agent	General outbreak	Family outbreak	Total Number in persons			Source			Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital		Suspected	Confirmed			
1	2	3	4	5	6	7			8	9	10
Campylobacter		1	4	0	1	unknown	x		epidemiologic coherence	Kenia	
Escherichia coli, pathogenic(1)		1	3	0	1	cheese	x			unknown	lack of preparation
Salmonella - S. Brandenburg		1	3	0	1	unknown				unknown	
Salmonella - S. Enteritidis		1	2	0	2	unknown				unknown	
Salmonella - S. Enteritidis		1	3	0	0	meat	x			household	
Salmonella - S. Enteritidis		2	4	0	3	unknown				household	
Salmonella - S. Enteritidis		1	3	0	0	unknown	x			trainings camp	
Salmonella - S. Enteritidis		1	3	0	0	icecream	x			icecream parlour	
Campylobacter - C. coli		1	2	0	0	restaurant in China	x			Restaurant in China	
Campylobacter - C. coli		1	2	0	0	Chicken	x			Restaurant	
Campylobacter - C. jejuni		1	3	0	0	chicken wings	x		epidemiologic coherence	Burger King	lack of hygienic measures
Campylobacter - C. jejuni		1	2	0	1	unknown				holiday in Croatia	
Campylobacter - C. jejuni		1	2	0	0	unknown		x	AGES Wien	household	
Campylobacter - C. jejuni		1	2	0	0	unknown		x	hospital	household	
Campylobacter - C. jejuni		1	2	0	0	unknown	x			family celebration	
Campylobacter - C. jejuni		5	11	0	5	unknown				unknown	
Campylobacter - C. jejuni		1	4	0	0	roasted chicken	x		epidemiologic coherence	household	lack of hygienic measures
Campylobacter - C. jejuni		1	3	0	0	unknown		x	hospital	household	
Campylobacter - C. jejuni		1	3	0	0	minced meat	x			household	
Campylobacter - C. jejuni		1	2	0	2	unknown			stool samples	household	
Campylobacter - C. jejuni		11	23	0	7	unknown				household	
Campylobacter - C. jejuni		1	2	0	0	turkey cutlets	x			household	
Campylobacter - C. jejuni		5	11	0	0	chicken	x			household	
Campylobacter - C. jejuni		1	2	0	1	raw milk	x			farm	
Campylobacter - C. jejuni		1	2	0	2	unknown		x	human diagnostic laboratory	household	
Campylobacter - C. jejuni		25	53	0	3	unknown	x		epidemiologic coherence	household	lack of hygienic measures
Campylobacter - C. jejuni		1	3	0	1	raw milk	x		epidemiologic coherence	household	raw milk

Campylobacter - C. jejuni		1	2	0	2	sandwich, sausage		x	hospital	bakery	
Campylobacter - C. jejuni		1	2	0	0	unknown			stool samples	Egypt	
Yersinia - Y. enterocolitica		1	4	0	1	raw milk	x		epidemiologic coherence	household	
Salmonella - S. Infantis		1	3	0	0	eggs, chicken	x			household	
Salmonella - S. Infantis	1	0	2	0	0	Kebab	x		epidemiologic coherence	Kebab food stall	lack of hygienic measures
Salmonella - S. Kedougou		1	2	0	1	unknown	x			household	
Salmonella - S. Montevideo		1	2	0	1	unknown	x		epidemiologic coherence	household	lack of hygienic measures
Salmonella - S. Montevideo		1	3	0	0	unknown		x	AGES Graz	household	
Salmonella - S. Saintpaul		1	2	0	0	liver	x			household	
Salmonella - S. Stourbridge	1	0	6	0	0	cheeses made from raw goat milk	x			unknown	coherence to french cheeses made from raw goat milk was not confirmed
Salmonella - S. Virchow		1	2	0	0	buffet, ice cubes	x			holiday in Kenia	
Salmonella - S. Virchow		1	2	0	0	unknown		x	AGES Graz	Egypt	
Salmonella - S. Virchow		1	2	0	1	Kebab	x			household	
Salmonella - Salmonella spp.		1	2	0	0	unknown				household	
Salmonella - Salmonella spp.		1	2	0	1	fried eggs	x			household	
Salmonella - Salmonella spp.		1	2	0	0	minced meat, eggs	x			household	
Salmonella - Salmonella spp.		1	4	0	0	mayonnaisesalad	x			barbecue	
Salmonella - Salmonella spp.		1	2	0	0	turkey cutlets	x			Czech Republic	
Salmonella - Salmonella spp.		1	2	0	1	unknown				Turkey	
Salmonella - Salmonella spp.		1	2	0	0	pork shashlik		x	hospital	Restaurant in Czech Republic	
Salmonella - S. group C		1	2	0	0	unknown				unknown	
Salmonella - S. group D		1	4	0	3	eggs/chicken	x			household	
Salmonella - S. group D		4	9	0	2	unknown				unknown	
Salmonella - S. group D		4	9	0	0	unknown			hospital	household	
Salmonella - S. group D		1	2	0	0	unknown				holiday in Greece	
Salmonella - S. group D		1	3	0	0	unknown				Greece	
Salmonella - S. group D		3	8	0	0	unknown			laboratory	household	
Salmonella - S. group D		1	2	0	0	unknown				Turkey	
Salmonella - S. group D		1	3	0	0	unknown				Greece, Kos	
Salmonella - S. group D		1	2	0	0	unknown				Bosnia	
Salmonella - S. group D		1	5	0	0	unknown			laboratory	farm	
Salmonella - S. group D		1	2	0	0	unknown	x			birthdayparty	
Salmonella - S. group D		1	2	0	1	sausage salad with egg	x			winebar Wachau	
Salmonella - S. group D1(2)		1	2	0	1	unknown	x			household	
Salmonella - S. Agona		1	2	0	0	unknown		x	AGES Graz	household	
Salmonella - S. Agona		1	5	0	0	Kebab	x			food stall	

Salmonella - S. Agona		1	2	0	1	chicken	x			household		
Salmonella - S. Kottbus		1	2	0	0	unknown	x		epidemiologic coherence	household	lack of hygienic measures	
Salmonella - S. Corvallis		1	2	0	0		x			Turkey, buffet		
Salmonella - S. Corvallis	1	0	11	0	0	Kebab		x	inspection by food authority, all patients consumed food from the same stall	Kebab food stall		
Salmonella - S. Corvallis		1	2	0	1	icecream	x			Turkey		
Salmonella - S. Stanley	1	0	3	0	0	unknown	x			holiday in Thailand		
Salmonella - S. Thompson		1	3	0	0	unknown				Greece		
Salmonella - S. Thompson		1	2	0	0	unknown				unknown		
Salmonella - S. group E		1	2	0	0	unknown			hospital	household		
Campylobacter - thermophilic Campylobacter spp., unspecified	1	0	9	0	0	cake	x			household		
Campylobacter - thermophilic Campylobacter spp., unspecified		2	4	0	0	unknown				household		
Campylobacter - thermophilic Campylobacter spp., unspecified		1	4	0	4	milk	x			farm		
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	salad	x		restaurant			
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	unknown				Croatia		
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	roasted chicken	x			household		
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	unknown		x	household			
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	sandwich	x			food stall		
Campylobacter - thermophilic Campylobacter spp., unspecified		2	4	0	2	unknown	x			household		
Campylobacter - thermophilic Campylobacter spp., unspecified	7	17	51	0	4	chicken, eggs, homemade butter	x			food stall	contaminated raw material	
Campylobacter - thermophilic Campylobacter spp., unspecified		2	6	0	0	unknown				unknown		
Campylobacter - thermophilic Campylobacter spp., unspecified		1	3	0	0	raw milk	x			household		
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	roasted chicken	x			household	1 was positive without symptoms	
Campylobacter - thermophilic Campylobacter spp., unspecified		3	7	0	3	chicken	x			household		
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	raw milk	x			farm	1 was positive without sympoms	
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	sandwich	x			household		

Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	1	turkey meat	x			household
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	unknown			hospital	household	
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	unknown	x			tavern	
Campylobacter - thermophilic Campylobacter spp., unspecified		17	38	0	7	unknown				unknown	
Campylobacter - thermophilic Campylobacter spp., unspecified	1	0	2	0	0	roasted chicken	x			tavern	
Campylobacter - thermophilic Campylobacter spp., unspecified	1	0	2	0	0	unknown	x			hotel	
Campylobacter - thermophilic Campylobacter spp., unspecified	1	0	2	0	0	hamburger	x		food inspection by official authority	tavern	
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	2	unknown		x	AGES Wien	household	
Campylobacter - thermophilic Campylobacter spp., unspecified		1	2	0	0	chicken liver		x	hospital	household	
Salmonella - S. Typhimurium - RDNC		1	3	0	1	chicken or potatoe salad	x			barbecue	
Salmonella - S. Typhimurium - RDNC		1	2	0	0	unknown				abroad	
Salmonella - S. Typhimurium - RDNC		1	3	0	0	unknown				unknown	
Salmonella - S. Typhimurium - RDNC		1	2	0	0	unknown				abroad	
Salmonella - S. Typhimurium - DT 46		1	3	0	0	eggs	x			household	
Salmonella - S. Typhimurium - DT 104l		1	2	0	0	unknown				household	
Salmonella - S. Typhimurium - DT 104l		1	3	0	0	Pizzabread with eggs	x			household	
Salmonella - S. Typhimurium - DT 104l		1	3	0	0	unknown				unknown	
Salmonella - S. Typhimurium - DT 120		2	4	0	2	unknown				household	
Salmonella - S. Typhimurium - DT 120	1	0	4	0	0	unknown	x			restaurant	
Salmonella - S. Typhimurium - DT 120	1	0	10	0	4	unknown	x			law court canteen	
Salmonella - S. Typhimurium - DT 120		1	2	0	2	unknown	x			household	lack of preparation
Salmonella - S. Typhimurium - DT 120		1	4	0	0	unknown	x			unknown	

Salmonella - S. Typhimurium - DT 193		1	3	0	0	unknown			household		
Salmonella - S. Typhimurium - DT 193		1	2	0	1	eggs	x		household		
Salmonella - S. Typhimurium - DT 41		1	2	0	1	crispy duck	x		Chinarestaurant		
Salmonella - S. Typhimurium - DT 41		1	9	0	8	Tiramisu	x		household		
Salmonella - S. Typhimurium - DT 41		1	3	0	2	eggs	x		household		
Salmonella - S. Typhimurium - DT 41		2	4	0	1	unknown			unknown		
Salmonella - S. Typhimurium - DT 4	1	0	4	0	1	unknown	x		unknown		
Salmonella - S. Typhimurium - DT 104H		1	3	0	0	chicken	x		household		
Salmonella - S. Typhimurium - U		2	4	0	0	Easter eggs	x		household		
Salmonella - S. Enteritidis - U		1	2	0	0		x		Turkey, buffet		
Salmonella - S. Enteritidis - U		1	2	0	0	cream	x		tavern		
Salmonella - S. Enteritidis - PT 1		6	12	0	2	unknown			unknown		
Salmonella - S. Enteritidis - PT 1		1	4	0	1	eggs	x		household		
Salmonella - S. Enteritidis - PT 1		1	2	0	1	Kebab	x		Kebab food stall		
Salmonella - S. Enteritidis - PT 1		1	3	0	0	Gyros, Tzatziki	x		Greek restaurant	lack of hygienic measures	
Salmonella - S. Enteritidis - PT 1		1	2	0	1	seafood	x		Mexican restaurant		
Salmonella - S. Enteritidis - PT 1	1	0	3	0	0	eggs	x		factory canteen		
Salmonella - S. Enteritidis - PT 1	1	0	13	0	0	cake		x	10 students from one class, all patients consumed the same cake	school	
Salmonella - S. Enteritidis - PT 1	1	0	8	0	3	egg dumplings	x			kindergarden	
Salmonella - S. Enteritidis - PT 1		5	12	0	2	unknown				household	
Salmonella - S. Enteritidis - PT 1		1	2	0	1	Sushi	x			Asian restaurant	
Salmonella - S. Enteritidis - PT 1		1	2	0	0	unknown				household	
Salmonella - S. Enteritidis - PT 1		1	2	0	2	turkey meat	x			household	
Salmonella - S. Enteritidis - PT 1		1	2	0	1	unknown		x	hospital	household	
Salmonella - S. Enteritidis - PT 1	1	0	10	0	5	salad	x			old peoples home	
Salmonella - S. Enteritidis - PT 1	1	0	4	0	0	mayonnaise	x			restaurant	
Salmonella - S. Enteritidis - PT 4(3)		1	2	0	0	unknown				holiday in Turkey	both persons had PT 4 and PT 21
Salmonella - S. Enteritidis - PT 4		18	36	0	12	unknown				household	
Salmonella - S. Enteritidis - PT 4		1	4	0	0	roasted chicken	x		epidemiologic coherence	chicken food stall	lack of hygienic measures
Salmonella - S. Enteritidis - PT 4		1	3	0	0	nutcake	x			household	

Salmonella - S. Enteritidis - PT 4	1	0	6	0	0	homemade Tiramisu	x			household	
Salmonella - S. Enteritidis - PT 4		1	3	0	0	gingerbread	x			household	
Salmonella - S. Enteritidis - PT 4		1	6	0	2	fried eggs		x	AGES Graz	household	
Salmonella - S. Enteritidis - PT 4		2	3	0	1	minced meat	x			Croatia	
Salmonella - S. Enteritidis - PT 4	1	0	8	0	4	egg dumplings	x			old peoples home	
Salmonella - S. Enteritidis - PT 4		1	2	0	2	Asia-menue		x	hospital	supermarket	
Salmonella - S. Enteritidis - PT 4		3	6	0	2	unknown		x	hospital	household	
Salmonella - S. Enteritidis - PT 4	1	0	10	0	0	Brotaufstriche		x	outbreak strain detected in eggs and samples from incriminated laying hen flock	tavern	lack of hygienic measures
Salmonella - S. Enteritidis - PT 4		1	2	0	0	mushroomsauce	x			household	
Salmonella - S. Enteritidis - PT 4		1	2	0	0	Lasagne Bolognese	x			household	
Salmonella - S. Enteritidis - PT 4		2	4	0	3	icecream	x			unknown	
Salmonella - S. Enteritidis - PT 4		1	9	0	0	dumplings	x		epidemiologic coherence	household	insufficiently cooked eggs
Salmonella - S. Enteritidis - PT 4		1	2	0	0	scrambled eggs	x			household	
Salmonella - S. Enteritidis - PT 4		12	25	0	5	unknown		x	AGES Graz, Vienna	household	
Salmonella - S. Enteritidis - PT 4		1	2	0	2	turkey sausage	x			household	
Salmonella - S. Enteritidis - PT 4		2	6	0	0	roasted chicken	x			household	
Salmonella - S. Enteritidis - PT 4		2	5	0	1	raw eggs	x			household	
Salmonella - S. Enteritidis - PT 4		1	2	0	0	fish	x			household	
Salmonella - S. Enteritidis - PT 4	1	0	2	0	0	curdcream with raw eggs	x			household	
Salmonella - S. Enteritidis - PT 4		1	12	0	1	cake	x			family celebration	
Salmonella - S. Enteritidis - PT 4		1	2	0	0	unknown		x	laboratory	household	
Salmonella - S. Enteritidis - PT 4		1	3	0	1	homemade salami-pizza	x			household	
Salmonella - S. Enteritidis - PT 4		1	3	0	1	homemade mayonnaisesalad	x			household	
Salmonella - S. Enteritidis - PT 4	1	0	5	0	0	homemade mayonnaisesalad		x	all patients consumed the same food	household	
Salmonella - S. Enteritidis - PT 4		1	2	0	1	unknown		x	AGES Graz	Bosnia	
Salmonella - S. Enteritidis - PT 4	1	9	28	0	5	eggs	x			household	
Salmonella - S. Enteritidis - PT 4		1	2	0	0	egg products/Tiramisu	x			Munich	
Salmonella - S. Enteritidis - PT 4		1	2	0	1	egg products	x			household	
Salmonella - S. Enteritidis - PT 4	1	0	35	0	1	dumplings		x	cohort study, outbreak strain detected in two incriminated laying hen flocks	celebration	Catering company

Salmonella - S. Enteritidis - PT 4		2	7	0	3	dumplings	x			household		
Salmonella - S. Enteritidis - PT 4		1	2	0	1	curd	x			household		
Salmonella - S. Enteritidis - PT 4		3	6	0	2	chicken	x			household		
Salmonella - S. Enteritidis - PT 4(4)		1	2	0	0	cake	x			holiday in Serbia	both persons had PT 4 and C. jejuni	
Salmonella - S. Enteritidis - PT 4	1	26	72	0	16	unknown	x			unknown		
Salmonella - S. Enteritidis - PT 4		1	2	0	0	unknown				Germany		
Salmonella - S. Enteritidis - PT 4		4	7	0	0	unknown				barbecue		
Salmonella - S. Enteritidis - PT 4	3	6	53	0	12	Tiramisu	x			family celebration		
Salmonella - S. Enteritidis - PT 4		1	3	0	0	Brotaufstriche	x			household		
Salmonella - S. Enteritidis - PT 4		6	18	0	4	slice of cream cake, mayonnaise	x			holiday in Croatia		
Salmonella - S. Enteritidis - PT 4		1	2	0	2	Spaghetti	x			tavern		
Salmonella - S. Enteritidis - PT 4		1	3	0	0	pancake with curd	x			household	lack of preparation	
Salmonella - S. Enteritidis - PT 4		1	2	0	0	minced meat	x			Restaurant in Germany		
Salmonella - S. Enteritidis - PT 4	1	0	30	0	3	Mascarponecream with eggs	x	epidemiologic coherence		festival	insufficiently cooked eggs	
Salmonella - S. Enteritidis - PT 4		2	4	0	3	fried eggs	x			household		
Salmonella - S. Enteritidis - PT 4		1	2	0	0	escalope with salads	x			household		
Salmonella - S. Enteritidis - PT 4	1	0	3	0	0	curdcake or turkey meat	x			tavern		
Salmonella - S. Enteritidis - PT 4		1	2	0	0	chicken and bowels	x			household		
Salmonella - S. Enteritidis - PT 4		1	3	0	0	chicken soup	x	epidemiologic coherence		household	lack of hygienic measures	
Salmonella - S. Enteritidis - PT 4		1	3	0	2	biscuit	x			household		
Salmonella - S. Enteritidis - PT 6		1	2	0	1	chicken soup	x			household		
Salmonella - S. Enteritidis - PT 6		1	3	0	0	fried eggs	x			Turkey		
Salmonella - S. Enteritidis - PT 6		1	3	0	0	red currant cake	x			household		
Salmonella - S. Enteritidis - PT 6		1	5	0	0	unknown		x	AGES Graz	household		
Salmonella - S. Enteritidis - PT 6		1	2	0	0	unknown		x	laboratory	household		
Salmonella - S. Enteritidis - PT 6		1	3	0	1	chicken Kebab	x			Kebab food stall		
Salmonella - S. Enteritidis - PT 6		1	2	0	0	eggs	x			household		
Salmonella - S. Enteritidis - PT 6		1	2	0	0	egg products	x			household		
Salmonella - S. Enteritidis - PT 6		1	4	0	1	dumplings	x			household		
Salmonella - S. Enteritidis - PT 6		1	3	0	2	unknown				unknown		
Salmonella - S. Enteritidis - PT 6		1	3	0	0	unknown		x	AGES Graz	household		
Salmonella - S. Enteritidis - PT 6		1	2	0	0	eggs	x			household		
Salmonella - S. Enteritidis - PT 8		1	2	0	2	turkey meat	x			household		
Salmonella - S. Enteritidis - PT 8		1	3	0	1	Tiramisu		x	AGES Graz	Shopping Center Czech Republic		
Salmonella - S. Enteritidis - PT 8		1	3	0	0	Tiramisu		x	AGES Graz	household		
Salmonella - S. Enteritidis - PT 8		1	3	0	1	Tiramisu	x			bakery	lack of preparation	
Salmonella - S. Enteritidis - PT 8		1	2	0	2	spread, hog roast		x	hospital	winebar		

Salmonella - S. Enteritidis - PT 8		1	2	0	2	roasted chicken		x	hospital	household		
Salmonella - S. Enteritidis - PT 8		2	4	0	1	raw eggs	x			household		
Salmonella - S. Enteritidis - PT 8		1	3	0	3	Omelette		x	AGES Graz	household		
Salmonella - S. Enteritidis - PT 8		2	5	0	3	minced meat	x			household		
Salmonella - S. Enteritidis - PT 8		1	3	0	1	Kebab	x			Kebab food stall		
Salmonella - S. Enteritidis - PT 8		1	2	0	0	homemade butter	x			household		
Salmonella - S. Enteritidis - PT 8		16	37	0	9	unknown				unknown		
Salmonella - S. Enteritidis - PT 8		1	2	0	2	unknown	x			unknown	lack of preparation	
Salmonella - S. Enteritidis - PT 8		1	2	0	0	icecream		x	hospital	Shopping Center		
Salmonella - S. Enteritidis - PT 8		1	2	0	0	horseradisch with eggyolk	x			household		
Salmonella - S. Enteritidis - PT 8	1	0	15	0	0	homemade salads, sauces and cakes	x		epidemiologic coherence	festival	lack of hygienic measures	
Salmonella - S. Enteritidis - PT 8(5)		1	2	0	0	cake	x			household		
Salmonella - S. Enteritidis - PT 8		1	2	0	0	unknown		x	hospital	household		
Salmonella - S. Enteritidis - PT 8		2	8	0	4	unknown	x		epidemiologic coherence	household	lack of hygienic measures	
Salmonella - S. Enteritidis - PT 8		1	3	0	0	tidbit	x			unknown		
Salmonella - S. Enteritidis - PT 8		1	2	0	1	roasted chicken	x			household		
Salmonella - S. Enteritidis - PT 8		1	2	0	0	raw eggs		x	laboratory	household		
Salmonella - S. Enteritidis - PT 8		1	2	0	0	icecream				pastry shop		
Salmonella - S. Enteritidis - PT 8		2	4	0	3	homemade mayonnaise salad	x			household		
Salmonella - S. Enteritidis - PT 8		2	6	0	4	eggs	x			household		
Salmonella - S. Enteritidis - PT 8		8	21	0	4	unknown	x			household		
Salmonella - S. Enteritidis - PT 8		7	15	0	0	unknown		x	AGES Graz	household		
Salmonella - S. Enteritidis - PT 8	2	0	9	1	2	unknown	x			China Restaurant		
Salmonella - S. Enteritidis - PT 8		2	4	0	0	Tiramisu homemade	x			household		
Salmonella - S. Enteritidis - PT 8		1	4	0	0	Tiramisu	x			pastry shop in Hungary		
Salmonella - S. Enteritidis - PT 8		8	21	0	2	Tiramisu	x			household		
Salmonella - S. Enteritidis - PT 8	1	0	12	0	3	Tiramisu	x			barbecue		
Salmonella - S. Enteritidis - PT 8		1	2	0	2	slice of cream cake	x			household		
Salmonella - S. Enteritidis - PT 8		1	3	0	1	sausage salad		x	AGES Graz	restaurant		
Salmonella - S. Enteritidis - PT 8		1	3	0	3	raw dough	x		epidemiologic coherence	household	raw eggs	
Salmonella - S. Enteritidis - PT 8	1	0	5	0	5	Parfait		x	AGES IBK	hotel		
Salmonella - S. Enteritidis - PT 8		1	4	0	1	nutcake with marzipan		x	AGES Graz	bakery		
Salmonella - S. Enteritidis - PT 8		1	2	0	0	mayonnaisesalad	x			household		
Salmonella - S. Enteritidis - PT 8		1	2	0	0	chicken nuggets	x			Fast Food restaurant		
Salmonella - S. Enteritidis - PT 8	1	0	4	0	3	chicken	x		epidemiologic coherence	kindergarden	lack of hygienic measures	

Salmonella - S. Enteritidis - PT 8		1	2	0	1	milk			outbreak strain detected in faeces samples of catlle from which the milk was originated	unknown		
Salmonella - S. Enteritidis - PT 8		1	4	0	0	icecream	x			tavern or household		
Salmonella - S. Enteritidis - PT 8		1	6	0	2	homemade mayonnaise salad	x		epidemiologic coherence	barbecue	raw eggs	
Salmonella - S. Enteritidis - PT 8		1	2	0	0	homemade curdcake		x	laboratory	household		
Salmonella - S. Enteritidis - PT 8		1	5	0	2	fried eggs	x			household		
Salmonella - S. Enteritidis - PT 8		1	3	0	1	curdcake	x			household		
Salmonella - S. Enteritidis - PT 8		2	4	0	0	chicken	x			household		
Salmonella - S. Enteritidis - PT 8	1	0	8	0	2	barbecue	x			barbecue		
Salmonella - S. Enteritidis - PT 14b	1	3	8	0	0	unknown				unknown		
Salmonella - S. Enteritidis - PT 14b		1	2	0	0	unknown		x	hospital	household		
Salmonella - S. Enteritidis - PT 14b		1	3	0	1	unknown				household		
Salmonella - S. Enteritidis - PT 14b		1	2	0	1	unknown	x			household		
Salmonella - S. Enteritidis - PT 14b		1	3	0	3	eggs	x			household		
Salmonella - S. Enteritidis - PT 21		1	3	0	2	unknown	x		epidemiologic coherence	household	lack of hygienic measures	
Salmonella - S. Enteritidis - PT 21	1	0	2	0	0	unknown				hotel	HACCP-System not documented	
Salmonella - S. Enteritidis - PT 21		1	3	0	0	turkey cutlets, egg dumplings	x		epidemiologic coherence	household	lack of hygienic measures	
Salmonella - S. Enteritidis - PT 21		1	2	0	0	Tiramisu	x					
Salmonella - S. Enteritidis - PT 21	1	0	2	0	0	Spaghetti Carbonara	x			tavern		
Salmonella - S. Enteritidis - PT 21	1	0	11	0	0	homemade cake		x	outbreak strain detected in eggs and food samples by Croatian Food Authority	Croatia	insufficiently cooked eggs	
Salmonella - S. Enteritidis - PT 21	1	0	14	0	3	eggs	x			hotel		
Salmonella - S. Enteritidis - PT 21		1	2	0	0	Spaghetti	x			household		
Salmonella - S. Enteritidis - PT 21	1	1	2	0	0	roasted chicken	x		food inspection by official authority	food stall		

Salmonella - S. Enteritidis - PT 21		1	3	0	0	eggs	x		household	
Salmonella - S. Enteritidis - PT 21		1	2	0	0	egg products/Tiramisu	x		household	
Salmonella - S. Enteritidis - PT 21	1	0	4	0	0	cake	x		kindergarden	
Salmonella - S. Enteritidis - PT 21		10	23	0	2	unknown			unknown	
Salmonella - S. Enteritidis - PT 21		7	14	0	5	unknown			household	
Salmonella - S. Enteritidis - PT 21		1	4	0	0	Tiramisu homemade	x		household	cross-contamination - lack of hygienic measures
Salmonella - S. Enteritidis - PT 21		1	2	0	1	roasted chicken	x		household	
Salmonella - S. Enteritidis - PT 21		1	4	0	2	pepper chicken		x	outbreak strain detected in 2 deep frozen chicken from the same batch	household	
Salmonella - S. Enteritidis - PT 21		1	3	0	0	pepper chicken	x		household	
Salmonella - S. Enteritidis - PT 21		1	2	0	0	noodle salad	x		household	
Salmonella - S. Enteritidis - PT 21		1	2	0	0	egg products	x		Croatia	
Salmonella - S. Enteritidis - PT 21	1	0	2	0	0	chicken breast	x		household	
Salmonella - S. Enteritidis - PT 21		4	9	0	6	unknown		x	AGES Graz	household	
Salmonella - S. Enteritidis - PT 21		1	3	0	0	unknown			Chinarestaurant	
Salmonella - S. Enteritidis - PT 21	1	0	4	0	0	Tiramisu	x		unknown	lack of preparation
Salmonella - S. Enteritidis - PT 21	1	0	85	0	14	mixed salad		x	cohort study; outbreak strain detected in eggs and flock of laying hens	tavern	cross-contamination - lack of hygienic measures
Salmonella - S. Enteritidis - PT 21		1	3	0	0	minced meat	x		household	
Salmonella - S. Enteritidis - PT 21		1	4	0	0	icecream			icecream parlour	
Salmonella - S. Enteritidis - PT 21		1	2	0	0	unknown			Turkey	
Salmonella - S. Enteritidis - PT 21		3	6	0	4	unknown		x	hospital	household	

Salmonella - S. Enteritidis - PT 21		1	2	0	0	unknown	x		unknown	lack of preparation
Salmonella - S. Enteritidis - PT 21		4	8	0	1	turkey meat	x	food inspection by official authority	household	
Salmonella - S. Enteritidis - PT 21	1	0	6	0	1	Tiramisu	x		household	birthday party
Salmonella - S. Enteritidis - PT 21		3	6	0	1	Tiramisu	x	case-controll-study	household	lack of preparation
Salmonella - S. Enteritidis - PT 21	1	0	15	0	0	Tiramisu		x AGES Graz	family celebration	insufficiently cooked eggs
Salmonella - S. Enteritidis - PT 21	1	0	22	0	5	salad with sliced chicken		x food inspection by official authority, outbreak strain detected in turkey flock	tavern	2 cooks became ill
Salmonella - S. Enteritidis - PT 21	1	0	3	0	1	Pizza	x	laboratory	restaurant	lack of hygienic measures
Salmonella - S. Enteritidis - PT 21		1	5	0	3	pancake with raisins	x	outbreak strain detected in dust samples of egg belts of incriminated laying hen flock	old peoples home	insufficiently cooked eggs
Salmonella - S. Enteritidis - PT 21		1	2	0	2	eggrice and crispy chicken	x	AGES Graz	Chinarestaurant	
Salmonella - S. Enteritidis - PT 21		1	4	0	2	chicken	x	hospital	household	
Salmonella - S. Enteritidis - PT 13a		1	2	0	1	chicken Kebab	x		Kebab food stall	
Salmonella - S. Enteritidis - PT 2	1	0	17	0	2	fried eggs	x		kindergarden	
Salmonella - S. Enteritidis - PT 2		2	4	0	1	unknown			unknown	
Salmonella - S. Enteritidis - PT 4b		1	2	0	1	egg liquor cake	x		household	
Salmonella - S. Enteritidis - PT 6a		1	3	0	0	unknown			household	
Salmonella - S. Enteritidis - PT 6a		1	3	0	0	Kebab	x	AGES Graz	Kebab food stall in Germany	
Salmonella - S. Enteritidis - PT 12		1	4	0	1	salad, iceream	x		holiday in Croatia	
Salmonella - S. Enteritidis - PT 12		1	2	0	0	unknown			holiday in Croatia	
Salmonella - S. Enteritidis - 14		1	2	0	0	smoked salmon	x		household	
Salmonella - S. Enteritidis - 19	1	0	33	0	?	minced meat, mushroom sauce, eggs		x laying flock and eggs harbouring the outbreak strain were identified	restaurant, households	in the restaurant lack of hygienic standards

Salmonella - S. Enteritidis - PT 5a	1	0	2	0	0	unknown			hotel	
Salmonella - S. Enteritidis - PT 5a		1	2	0	1	chicken	x		household	
Salmonella - S. Enteritidis - PT 5a		2	5	0	3	unknown		x	hospital	household		
Salmonella - S. Enteritidis - PT 5a		1	2	0	1	egg dumplings	x			household		
Salmonella - S. Enteritidis - PT 5a		6	11	0	2	unknown	x			unknown		
Salmonella - S. Enteritidis - PT 5a		1	4	0	0	several food stuff with eggs		x	outbreak strain detected in flock of laying hens	household	insufficiently cooked eggs	
Salmonella - S. Enteritidis - PT 5a	1	0	28	0	4	chocolate mousse		x	cohort study	family celebration		
Salmonella - S. Enteritidis - PT 5a	1	0	10	0	0	egg dumplings	x		epidemiologic coherence	staff canteen	lack of hygienic measures	
Salmonella - S. Enteritidis - PT 5a		3	7	0	0	unknown	x			household		
Salmonella - S. Enteritidis - PT 5a		2	4	0	1	chocolate mousse		x	laboratory	family celebration		
Salmonella - S. Enteritidis - PT 34	1	0	3	0	0	biscuit	x			bakery		
Salmonella - S. Enteritidis - PT 34		1	2	0	1	egg products/Tiramisu	x			household		
Salmonella - S. Enteritidis - PT 7a	1	0	4	0	0	dumplings	x			alpine hut		
Salmonella - S. Enteritidis - PT 13		1	2	0	0	unknown	x			household		
Salmonella - S. Enteritidis - PT 1c		1	2	0	1	unknown	x			unknown		
Salmonella - S. Enteritidis - PT 41		1	4	0	1	unknown				unknown	1 person had also PT 8	
Salmonella - S. Enteritidis - PT 41		2	4	0	0	unknown				household		
Salmonella - S. Enteritidis - PT 9		1	2	0	0	unknown				household		
Salmonella - S. Enteritidis - RDNC		1	3	0	0	filled peppers with minced meat	x			Croatia	lack of preparation	
Salmonella - S. Enteritidis - RDNC		1	3	0	0	unknown				household		
Salmonella - S. Enteritidis - RDNC		1	2	0	0	unknown				unknown		
Yersinia - Y. enterocolitica - Y. enterocolitica O:3		1	2	0	0	unknown	x		epidemiologic coherence	household		

Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O157		1	2	0	1	beef, mozarella	x		epidemiologic coherence	household	
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	1	0	22	0	0	sandwich	x		workstation	lack of hygienic measures	

(1) : Escherichia coli, pathogenic - EHEC
(2) : Salmonella - S. group D1:H-
(3) : additionally PT 21 isolated from patients
(4) : additionally C. jejuni isolated from patients
(5) : additionally PT 13a was isolated from patients