AUSTRIA

The Report referred to in Article 5 of Directive 92/117/EEC

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 2004

AGES
Österreichische Agentur für Gesundheit und Ernährungssicherheit GmbH

BUNDESMINISTERIUM FÜR GESUNDHEIT UND FRAUEN
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INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Austria**

Reporting Year: **2004**

Institutions and laboratories involved in monitoring:

Institute or Laboratory name	Description	Contributing to the Report
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
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
Competence Centre Infectious Diseases Epidemiology	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 Campylobacter in humans
National Reference Laboratory for EHEC (VTEC), Department of Hygiene, Microbiology and Social Medicine, Division of Hygiene & Medical Microbiology	Innsbruck Medical University	Data concerning VTEC in humans

Institute or Laboratory name	Description	Contributing to the Report
National Reference Laboratory for Listeria, Department of Hygiene, Microbiology and Social Medicine, Division of Hygiene & Medical Microbiology	Innsbruck Medical University	Data concerning Listeria in 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 Salmonella Institute for Medical Microbiology and Hygiene, Graz	Austrian Agency for Health and Food Safety, AGES	Data concerning Salmonella in feedingstuff, animals, foodstuff and humans
National Reference Laboratory for Yersinia Institute for Medical Microbiology and Hygiene, Linz	Austrian Agency for Health and Food Safety, AGES	Data concerning Yersinia in humans
National Reference Laboratory for Tuberculosis, Institute for Medical Microbiology and Hygiene, Vienna	Austrian Agency for Health and Food Safety, AGES	Data concerning Mycobacteria in humans
National Reference Laboratory for Brucellosis, Institute for Veterinary Disease Control, Moedling	Austrian Agency for Health and Food Safety, AGES	Data concerning brucellosis in animals and humans
Food Safety Department of the City of Vienna	Regional Laboratory	Data concerning investigations in foodstuffs
Institute for Food Investigation of the State Vorarlberg	Regional Laboratory	Data concerning investigations in foodstuffs
Official Food Control Laboratories in Vienna, Graz, Linz, Innsbruck and Salzburg	Austrian Agency for Health and Food Safety, AGES; Laboratories in Graz, Innsbruck, Linz, Salzburg and Vienna	Data concerning investigations in foodstuffs

Institute or Laboratory name	Description	Contributing to the Report
Carinthian Institute for Veterinary Disease Control, Ehrental	Regional Veterinary Laboratory	Data concerning investigations in animals; bacteriological investigation in slaughtered animals
Magistrat der Landeshauptstadt St. Pölten, Veterinärverwaltung	Regional Laboratory	Bacteriological investigation in slaughtered animals
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
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
National Reference Laboratory for Trichinellosis in Animals, Institute for Veterinary Disease Control, Innsbruck	Austrian Agency for Health and Food Safety, AGES	Data concerning Trichinella in animals
Institutes for Veterinary Disease Control	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
Institute of Parasitology and Zoology Department for Pathobiology	University of Veterinary Medicine Vienna	Data concerning Echinococcus in foxes
NÖ-Genetik Rinderbesamung GmbH	Institutes for Artificial Insemination	Results of investigation of brucellosis and tuberculosis in breeding bulls
Besamungsstation Birkenberg	Institutes for Artificial Insemination	Results of investigation of brucellosis and tuberculosis in breeding bulls

Institute or Laboratory name	Description	Contributing to the Report
Besamungs- und Embrytransferstation der Universitätsklinik für Geburtshilfe, Gynäkologie und Andrologie der Veterinärmedizinischen Universität, Wien	Institutes for Artificial Insemination	Results of investigation of brucellosis and tuberculosis in breeding bulls
Besamungsstation Klessheim	Institutes for Artificial Insemination	Results of investigation of brucellosis and tuberculosis in breeding bulls
Tiersamengewinnungsanstalt Perkohof	Institutes for Artificial Insemination	Results of investigation of brucellosis and tuberculosis in breeding bulls
Embryotransferstation der Oberösterreichischen Besamungsstation GmbH	Institutes for Artificial Insemination	Results of investigation of brucellosis and tuberculosis in breeding bulls
Embryo-Entnahmestation für Rinderembryonen an der Rinderbesamungsanstalt Gleisdorf	Institutes for Artificial Insemination	Results of investigation of brucellosis and tuberculosis in breeding bulls
Institute for Agricultural Analysis, Linz	Austrian Agency for Health and Food Safety, AGES	Data concerning feedingstuff

PREFACE

This report is submitted to the European Commission in accordance with Article 5 of Council Directive 92/117/EEC[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 2004. 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.

[1] Council Directive 92/117/ECC of 17 December 1992 concerning measures for protection against specified zoonoses and specified zoonotic agents in animals and products of animal origin in order to prevent outbreaks of foodborne infections and intoxications, OJ L 62, 15.3.1993, p. 38

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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.

Table 14.1 Susceptible animal populations: number of herds and holdings rearing animals

* Only if different than reference year dicated above

Animal species	Category of animals	Number of herds or flocks		Number of holdings	
			Year*		Year*
Bovine animals	In total	not available		86.034	
Sheep	In total	not available		16.941	
Goats	In total	not available		10.946	
Pigs	In total	not available		51.265	
Hens (Gallus gallus)	In total	3.987		1.300	
	Breeding animals in total	77		77	
	Breeding animals for egg production line in total	not existing		not existing	
	Breeding animals for meat production line in total	not existing		not existing	
	Elite birds in total	not existing		not existing	
	Elite birds for egg production line	not existing		not existing	
	Elite birds for meat production line	not existing		not existing	
	Grandparent birds in total	not existing		not existing	
	Grandparent birds for egg production line	not existing		not existing	
	Grandparent birds for meat production line	not existing		not existing	
	Parent birds in total	not existing		not existing	
	Parent birds for egg production line	20		20	
	Parent birds for meat production line	57		57	
	Laying hens	not available		769	
	Broilers	3.910		454	
	Mixed flocks/ holdings	0		0	
Turkey	In total	246		133	
	Breeding animals in total	not existing		not existing	
	Elite birds	not existing		not existing	
	Grandparent birds	not existing		not existing	
	Parent birds	not existing		not existing	
	Meat production birds	246		133	
	Mixed flocks/ holdings	not available		not available	

Table 14.2 Susceptible animal populations: number of animals

* Only if different than reference year indicated above

Animal species	Category of animals	Livestock numbers (live animals)		Number of slaughtered animals	
			Year*		Year*
Bovine animals	In total	2.050.991		674.070	
	Calves (under 1 year)	646.946		99.389	
	Dairy cows and heifers	926.222		262.870	
	Meat production animals	246.880		311.811	
Sheep	In total	327.163		298.493	
	Animals over 1 year	not object of census		42.399	
	Animals under 1 year (lambs)	not object of census		256.094	
Goats	In total	55.523		44.681	
	Animals over 1 year	not object of census		8.587	
	Animals under 1 year	not object of census		36.094	
Pigs	In total	3.125.361		5.397.670	
	Sows and gilts	317.033		not available	
Hens (Gallus gallus)	In total	56.025.203		59.495.471	
	Breeding animals in total	549.815		not existing	
	Grandparent birds in total	not existing		not existing	
	Grandparent birds for egg production line	not existing		not existing	
	Grandparent birds for meat production line	not existing		not existing	
	Parent birds in total	549.815		not available	
	Parent birds for egg production line	87.105		not available	
	Parent birds for meat production line	462.710		not available	
	Laying hens	not available		not available	
	Broilers	55.475.388		59.495.471	
Turkey	In total	1.875.950		2.169.003	
	Breeding animals in total	not existing		not existing	
	Elite birds	not existing		not existing	
	Grandparent birds	not existing		not existing	
	Parent birds	not existing		not existing	
	Meat production birds	1.875.950		2.169.003	
Horses		not object of census		1.033	

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% in 2004. Consumption eggs are presently the major source of human infection.

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. Salmonellosis in humans

A. Salmonellosis in humans

Case definition

Clinical picture compatible with salmonellosis, e.g. diarrhoea, abdominal pain, nausea and sometimes vomiting. The organism may cause extraintestinal infections. Laboratory criteria for diagnosis: Isolation of *Salmonella* spp. (non-typhi, non-paratyphi) from a clinical specimen.

Case classification

- Probable: A laboratory confirmed isolate without clinical information or, a case with clinical symptoms that has an epidemiological link
- Confirmed: A clinically compatible case that is laboratory confirmed

Diagnostic/analytical methods used

Bacteriology: Samples material is processed as described in Richtlinien für die Diagnostik von Salmonellen (Anonymus: Standardisierung und Qualitätssicherung in der mikrobiologischen Diagnostik. Richtlinien. Bundesministerium für Soziale Sicherheit und Generationen. ISBN 3-84123-126-0, Wien, 2001, pg. 11-12).

At the NRL Salmonella all strains are 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.

Notification system in place

Specialists in Laboratory Diagnosis or Microbiology and Hygiene and the attended physicians are subjected to notification. Notification of salmonellosis according to the epidemic act has been mandatory since 1950 (BGBl. 1950/186 Epidemiegesetz, as amended).

History of the disease and/or infection in the country

In 1989 and 1990, human infections with *S.* Enteritidis increased markedly in Austria. After a peak in 1992, the incidence of salmonella illness decreased, but the number of infections has remained at a high level until 2003. In 2004 the number of laboratory confirmed cases of human *Salmonella* infections decreased by almost 12% (2003: 8271, 2004: 7286).

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

The number of laboratory confirmed cases of human *Salmonella* infections decreased substantially in 2004. More than 83% of all human infections are caused by *S.* Enteritidis. Phage type 4 of *S.* Enteritidis, which was predominant for many years, dropped further and accounted for 41.7% of all *S.* Enteritidis isolates in 2004. *S.* Enteritidis PT 8 (30.8%) and *S.* Enteritidis PT 21 (11.7%) were on second and third place. The overall resistance-rates against antibiotics remained stable over the past years. Table-eggs are probably the main source of human infection of *S.* Enteritidis.

Relevance as zoonotic disease

In 2004 more than 83% of all human infections were caused by *S.* Enteritidis. Knowledge won by outbreak investigations, the low rate of *S.* Enteritidis in poultry-meat and the results of case-

control studies point at table-eggs as main source of human infection of *S.* Enteritidis in Austria. Chicken meat is probably only of minor importance, regardless of phage type. This applies to chicken meat as direct source of infection as well as infections from secondary contamination.

Table 3.4.1.A Salmonellosis in man - species/serotype distribution

	Cases	Incidence per 100.000	Imported cases	Incidence per 100.000
Salmonellosis	7286	89,51	188	
***S.* Enteritidis**	6076	74,64	148	
***S.*Typhimurium**	697	8,56	9	
of these: DT 104	61	0,75	0	
S. Infantis	83	1,02		
S. Thompson	39	0,48		
S. Hadar	29	0,36		
S. Virchow	27	0,33		
S. Kentucky	20	0,25		
S. Paratyphi B var. Java	19	0,23		
S. Newport	16	0,20		
S. Typhi	13	0,16		
S. Braenderup	12	0,15		
S. Paratyphi-B	12	0,15		
S. Anatum	11	0,14		
S. Agona	10	0,12		
S. Blockley	10	0,12		
S. Saintpaul	10	0,12		

Table 3.4.1.B Salmonellosis in man - age distribution

	Salmonellosis			*S.* Enteritidis			*S.* Typhimurium		
Age group	**All**	**M**	**F**	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year	190	91	70	143	70	53	26	13	9
1 to 4 years	984	525	459	806	427	379	128	72	56
5 to 14 years	1.480	787	693	1.312	683	629	123	77	46
15 to 24 years	936	457	479	744	359	385	106	54	52
25 to 44 years	1.553	768	785	1.220	589	631	179	94	85
45 to 64 years	1.127	487	630	961	429	532	74	29	45
65 years and older	901	360	541	796	311	485	47	22	25
Age unknown	115	53	54	94	46	43	14	4	8
All age groups	7.286	3.528	3.711	6.076	2.914	3.137	697	365	326

Table 3.4.2 Salmonellosis in man - seasonal distribution

Month	*Salmonella sp.* Cases	*S.* Enteritidis Cases	*S.* Typhimurium Cases
January	299	242	31
February	228	149	29
March	291	244	15
April	326	284	20
May	376	334	20
June	652	570	38
July	1.041	834	149
August	1.186	1.025	103
September	1.238	989	170
October	699	603	54
November	567	477	42
December	383	325	26
Total	7.286	6.076	697

2.1.3. Salmonella in foodstuffs

A. *Salmonella* spp. in food - all foodstuffs - official food or feed controls

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 AV 31.912/16-IV/B/10/03 of 22.12.2003).

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.

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.

Table 3.3.1 *Salmonella* sp. in meat and meat products (part A)

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Agona	S. Amsterdam	S. Anatum	S. Blockley	S. Baeruserup	S. Braenderup	S. Brandenburg	S. Bredeney	S. Cerro	S. Derby	S. Dublin	S. Goldcoast	S. Hadar	S. Havanna	S. Heidelberg	S. Indiana	S. Infantis	S. Kinondoni	S. Kentucky	S. Kottbus	S. London	S. Manhattan	S. Montevideo	S. Muenchen	S. Newport	S. Ohio	S. Paratyphi	S. Paratyphi var. Java	S. Reading	S. Rissen	S. Saintpaul	S. Senftenberg	S. sp.(not typable)	S. Stanley	S. Thompson	S. Virchow	S. Worthington	monoph.Stamm d.S.B-Gr.	S. Schwarzengrund
Broiler meat and products thereof																																															
Broiler meat - fresh																																															
at retail level(incl. At processing plant)			S	25-50g	1.042	89	32	12	1		1	1				1				1	2		1	4	14		2	7			1			1				1		1	2		2	1			1
Minced meat from broiler meat																																														
at retail level(incl. At processing plant)			S	25-50g																																										
Broiler meat - meat products - non-ready-to-eat																																														
at retail level(incl. At processing plant)			S	25-50g	84	6	1	1					1											1	1															1						
Broiler meat - meat products - ready-to-eat																																														
at retail level(incl. At processing plant)			S	25-50g	451	12	5					1												1	2														1				2			
Turkey meat and products thereof																																														
Turkey meat - fresh																																														
at retail level(incl. At processing plant)			S	25-50g	124	9		2			1	1					1	1			1									1								1							
Minced meat from turkey meat																																														
at retail level(incl. At processing plant)			S	25-50g	2	0																																								
Turkey meat - meat products - non-ready-to-eat																																														
at retail level(incl. At processing plant)			S	25-50g	19	0																																								
Turkey meat - meat products - ready-to-eat																																														
at retail level(incl. At processing plant)			S	25-50g	15	0																																								
Pig meat and products thereof																																															
Pig meat - fresh																																														
at slaughterhouse		*)	A	25g	299	0																																								
at retail level(incl. At processing plant)			S	25-50g	42	2	1																																				1				
Minced meat from pig meat																																														
at retail level(incl. At processing plant)			S	25-50g	35	0																																								
Pig meat - meat products - non-ready-to-eat																																															
at retail level(incl. At processing plant)			S	25-50g	275	3												2										1																	
Pig meat - meat products - ready-to-eat																																														
at retail level(incl. At processing plant)			S	25-50g	193	0																																								

Table 3.3.1 *Salmonella* sp. in meat and meat products (part B)

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Agona	S. Amsterdam	S. Anatum	S. Blockley	S. Baeruserup	S. Braenderup	S. Brandenburg	S. Bredeney	S. Cerro	S. Derby	S. Dublin	S. Goldcoast	S. Hadar	S. Havanna	S. Heidelberg	S. Indiana	S. Infantis	S. Kinondoni	S. Kentucky	S. Kottbus	S. London	S. Manhattan	S. Montevideo	S. Muenchen	S. Newport	S. Ohio	S. Paratyphi	S. Paratyphi var. Java	S. Reading	S. Rissen	S. Saintpaul	S. Senftenberg	S. sp.(not typable)	S. Stanley	S. Thompson	S. Virchow	S. Worthington	monoph.Stamm d.S.B-Gr.	S. Schwarzengrund
Bovine meat and products thereof																																															
Bovine meat- fresh																																															
at slaughterhouse		*)	A	25g	3940	2	1																		1																						
at retail level(incl. At processing plant)			S	25-50g	24	1																																		1							
Minced meat from bovine meat																																														
at retail level(incl. At processing plant)			S	25-50g	9	0																																								
Bovine meat - meat products - non-ready-to eat																																														
at retail level(incl. At processing plant)			S	25-50g	8	0																																								
Bovine meat - meat products- ready-to-eat																																														
at retail level(incl. At processing plant)			S	25-50g	17	0																																								
Other animals or mixed products thereof																																														
Other fresh meat																																														
at slaughterhouse		*)	A	25g	21	0																																								
at retail level(incl. At processing plant)			S	25-50g	20	1		1																																						
Minced meat from other meat																																														
at retail level(incl. At processing plant)			S	25-50g	7	0																																								
Minced meat mixed																																														
at retail level(incl. At processing plant)			S	25-50g	93	3		1																	1																				1	
Other animals or mixed products - meat products - non-ready-to-eat																																														
at retail level(incl. At processing plant)			S	25-50g	12	0																																								
Other animals or mixed products - meat products - ready-to-eat																																														
at retail level(incl. At processing plant)			S	25-50g	118	1						1																																		

A= animals
S= sample
*)after emergency slaughter or meat inspection act carcasses that gave reasons for suspicion were retained and tested for bacterial agents in official laboratories

Table 3.3.2 *Salmonella* sp. in other food

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Senftenberg	S. Tennessee	S. Paratyphi B var. Java	S. d. Gruppe D	S. Livingstone	S. II 9,12:d:e,n,x (S. Rhodesiense II)	S. Hvittingfoss	S. 16:b:-(S. monoph. Stamm I-Gr.)	S. Morehead	S. Weltevreden	S. Rubislaw	S. Litchfield	S. Mbandaka	S. Soerenga	S. Wandsworth	S. Javiana	S. Freetown	S. Abaetetuba	monoph. Stamm d. S. B-Gr.	S. Muenchen	S. Weltevreden	S. Braenderup	S. Blockley	S. Infantis	S. Halle	S. Saintpaul	non-typable
Milk and milk products																																		
Milk, raw			S	25g	115	1																												
Ready to eat milk products			S	25g	1482	0																												
Milk, pastorized			S	25g	61	0																												
cheese			S	25g	70	0																												
Eggs and egg products																																		
Table eggs			S	50g	318	4*	3	1																					1					
Raw materials for egg products			S		29	18	15														1										2			
Egg products			S	25g	369	26	3						21#																					
Fish and fish products																																		
Fish products			S	25g	201	0																												
Other food																																		
noodles			S	25g	20	1	1																											
ice cream			S	50 g	1.506	1	1																											
spices		***	S	25 g	600	42**			1	1	6	1		1	3	1	2	5	1	2	3	2	1	6	2	2	1	1	1						2
spices		****	S	25g	37	3															1											1	1	
Rest (vegetable prod.)			S	25g	1463	12	6	1			1																			1	3			

* 1 sample contaminated with 2 different serotypes
** 3 samples contaminated with 2 different serotypes
***EU-coordinated control campaign: Cheeses prepared from thermised milk
****other samples
always the same production plant

2.1.4. 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, broken eggshells

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): Day-old chicks

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

Visibly soiled 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!

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 treated with antimicrobials. 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 2004 more than 83% out of 7286 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 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.

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: 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.

Broiler flocks: Day-old chicks

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

Broiler flocks: Rearing period

Other: no legal requirements

Broiler flocks: Before slaughter at farm

Other: 3 weeks before slaughter at farm

Broiler flocks: At slaughter (flocks based approach)

Other: No sampling

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, broken eggshells.

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.

Broiler flocks: Day-old chicks

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

Broiler flocks: Rearing period

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

Broiler flocks: Before slaughter at farm

Other: 9 cloacal swabs per flock

Broiler flocks: At slaughter (flocks based approach)

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

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

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 (flocks 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

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 (flocks based approach)

No sampling

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

Broiler flocks: Day-old chicks

Other: See day-old chicks

Broiler flocks: Rearing period

Other: See day-old chicks

Broiler flocks: Before slaughter at farm

Other: See day-old chicks

Broiler flocks: At slaughter (flocks based approach)

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 with antimicrobials.

Broiler flocks: Rearing period

Flocks were treated with antimicrobials.

Broiler flocks: Before slaughter at farm

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

Broiler flocks: At slaughter (flocks 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

Meat production flocks: Day-old chicks

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

Meat production flocks: Rearing period

Other: no legal requirements

Meat production flocks: Before slaughter at farm

Other: 3 weeks before slaughter at farm

Meat production flocks: At slaughter (flocks based approach)

Other: No sampling

Type of specimen taken

Meat production flocks: Day-old chicks

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

Meat production flocks: Rearing period

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

Meat production flocks: Before slaughter at farm

Other: 9 cloacal swabs per flock

Meat production flocks: At slaughter (flocks based approach)

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 legal requirements, e.g. visibly soiled hatcher basket liners

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

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

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

9 cloacal swabs

Meat production flocks: Day-old chicks

No sampling

Meat production flocks: Rearing period

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

Meat production flocks: Before slaughter at farm

9 cloacal swabs

Meat production flocks: At slaughter (flocks 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 (flocks based approach)

No sampling

Diagnostic/analytical methods used

Meat production flocks: 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.

Meat production flocks: Rearing period

Other: see day-old chicks

Meat production flocks: Before slaughter at farm

Other: see day-old chicks

Meat production flocks: At slaughter (flocks based approach)

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 - all animals (except poultry)

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: Samples sent to a bacteriological laboratory are examined.

Animals at slaughter (herd based approach)

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: Feces or intestinal content

Animals at slaughter (herd based approach)

Other: 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: 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: 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 3.2.1 *Salmonella* sp. in Poultry breeding flocks (*Gallus gallus*)

	Source of information	Remarks	Epidemiological unit	Flocks tested	Flocks positive	S. Enteritidis	S. Typhimurium	S. *Hadar*
Egg production line								
Breeding flocks								
Elite								
Grandparents								
Parents			flock	20				
Day-old chicks								
Rearing flocks			flock	9	0			
Productive period			flock	11	1	1		
Parents, unspecified								
Meat production line								
Breeding flocks								
Elite								
Grandparents								
Parents			flock	57	2			2
Day-old chicks								
Rearing flocks			flock	10	2			2
Productive period			flock	47	0			
Parents, unspecified								

Source of information:
Central Veterinary Service and Austrian Health Poultry Service

Table 3.2.2 *Salmonella* sp. in other commercial poultry

Animal species	Source of information	Remarks	Epidemiological unit	Flocks tested	Flocks positive	S. Enteritidis	S. Typhimurium	S. Bere	S. Braenderup	S. Anatum	S. Havana	S. Indiana	S. Infantis	S. Mbandaka	S. Stanleyville	S. Kentucky	S. Senftenberg	S. Thompson	S. Virchow	S. Montevideo	S. Saintpaul	S. Agona	S. Blockley	S. Bredeney	S. Kottbus	S. Meleagridis	S. Livingstone
Fowl (Gallus gallus)																											
Layers																											
Day-old chicks				252	0																						
Rearing period				393	3	3																					
Productive flocks			flock	1.896	35	17		2	6		1	1	4	2	2												
Layers, unspecified			flock	108	3	2	1																				
Broilers																											
Day-old chicks			flock	3.619	118	73	2	2				2		14		9	8	2	6								
Rearing period		1. testing	flock	3.910	72	21	11		2			10		2		10		1	1			1	3	1	8	1	
Rearing period		2. testing	flock	72	0	0																					
Broilers, unspecified			flock	71	0																						
Ducks																											
Breeders																											
Productive flocks																											
Ducks, unspecified			flock	38	2	2																					
Geese																											
Breeders																											
Productive flocks																											
Geese, unspecified			flock	48	7					6		1															
Turkeys																											
Breeders																											
Productive flocks			flock	185	13		2						1	1			1			2	5						1
Turkeys, unspecified																											

Table 3.2.3 *Salmonella* sp. in non-commercial poultry and birds

Animal species	Source of information	Remarks	Epidemiological unit	Flocks tested	Flocks positive	S. Enteritidis	S. Typhimurium	*S. Kottbus*
Pigeons			animals	42	7		7	
Guinea fowl			animals	3	2			2
Quails			animals	0	0			
Pheasants			animals	3	0			
Partridges			animals	3	0			
Ostriches			animals	36	0			

Table 3.2.4 *Salmonella* sp. in animals (non poultry)

Animal species	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Illa	S. Sachsenwald IV	S. Kedougou	S. Derby	S. Schwarzengrund	S. IIIb 61:k:1,5,7	S. Indiana	S. Bredeney
Cattle			animals	1.845	1		1								
Sheep			animals	143											
Goats			animals	25											
Pigs															
Breeding herds															
Fattening pigs															
Pigs, unspecified			animals	1.424	5		1		1	1	1				1
Solipeds			animals	40	1							1			
Other															
Dog			animals	98	1								1		
Cat			animals	82											
deer			animals	19	1									1	
other			animals	58	2		1	1							

2.1.5. Salmonella in feedstuffs

A. *Salmonella* spp. in feed - all feeding stuffs - in total – monitoring programme - active monitoring

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: 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 feeding stuffs

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 feeding stuffs

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 feeding stuffs

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 feeding stuffs

Salmonella spp. isolated from the sample

Diagnostic/analytical methods used

Domestic feed material of plant origin

Other: Bacteriological method: ISO 6579:2002; sample weight: 50 g; 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.

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 feeding stuffs

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 feeding stuffs

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 3.1.1 *Salmonella* sp. in feed material of animal origin

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S . Enteritidis	S . Typhimurium
Milk products								
Land animal products								
Meat meal								
Meat and bone meal								
Bone meal								
Greaves								
Poultry offal meal								
Feather meal								
Blood meal								
Animal fat								
Fish, other marine animals, their products and by-products, other fish-products								
Fish meal	*)		batch	25g	44	0		
Fish oil								
Fish silage								
Other fish products								

*) quality assurance program of private companies

Table 3.1.2.1 *Salmonella* sp. in feed of vegetable origin: non-compulsory testing

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis PT21	S. Typhimurium	S. Cubana	S. Montevideo	S. Senftenberg	S. Tennessee	S. Lexington	S. Senneville	S. Kentucky	S. Infantis	S. Hadar	S. Orion	S. Mbandaka
Cereal grains, their products and by-products																			
Barley (and derived)		*)	batch	25g	21	2		2											
Wheat (and derived)		*)	batch	25g	26	0													
Maize		*)	batch	25g	11	0													
Maize (derived)		*)	batch	25g	18	0													
Other		*)	private samples	25 g	381	13	2	1		3		3					1		3
Oil seeds, oil fruits, their products and by-products																			
Groundnut derived		*)	batch	25 g	2	0													
Rape seed derived		*)	batch	25 g	349	25			1	18	4					1		1	
Palm kernel derived		*)	batch	25 g	21	0													
Soya (bean) derived		*)	batch	25 g	72	4			1	1						1			1
Cotton seed derived																			
Sunflower seed derived		*)	batch	25 g	242	14				11		2	1						
Linseed derived		*)	batch	25 g	6	0													
Other oil seeds derived		*)	batch	25 g	4	2								1	1				
Other materials																			
Legume seeds, ...		*)	batch	25 g	16	0													
Tubers, roots, ...																			
Other seeds and fruits																			
Forages and roughage																			
Other plants, ...		*)	private samples	25g	29	0													

*) Quality assurance program of private companies

Table 3.1.2.2 *Salmonella* sp. in feed of vegetable origin: compulsory testing

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. *Infantis*
Cereal grains, their products and by-products									
Barley (and derived)	*)		batch	50 g	2	0			
Wheat (and derived)	*)		batch	50 g	1	0			
Maize									
Maize (derived)									
Other									
Oil seeds, oil fruits, their products and by-products									
Groundnut derived	*)		batch	50 g	1	0			
Rape seed derived	*)		batch	50 g	12	0			
Palm kernel derived									
Soya (bean) derived	*)		batch	50 g	52	1			1
Cotton seed derived									
Sunflower seed derived	*)		batch	50 g	1	0			
Linseed derived	*)		batch	50 g	15	0			
Other oil seeds derived	*)		batch	50 g	7	0			

*) Compulsory monitoring program (Futtermittel-Gesetz 1999)

Table 3.1.3.1 *Salmonella* sp. in compound feeding stuff: non-compulsory testing

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Bere	S. Senftenberg	S. Livingston	S. Derby	S. Meleagridis	S. Tennessee	S. Mbandaka	S. Rissen	S. Putten
Cattle																	
Process control																	
Final product		*)	batch	25g	62	0											
Pigs																	
Process control																	
Final product		*)	batch	25g	15	0											
Poultry																	
Poultry (not specified)																	
Process control																	
Final product																	
Poultry - Breeders																	
Process control																	
Final product																	
Poultry - Layers																	
Process control																	
Final product		*)	batch	25g	120	2								1		1	
Poultry - Broiler																	
Process control		*)	batch	25g	8	1							1				
Final product		*)	batch	25g	407	5**			1	2	1				1	1	1
Pet food																	
Dog snacks (pigs ears, chewing bones)		*)	batch	25g	41	6		4			1	1					

*) Quality assurance program of privat companies

** two different serotypes in two samples

Table 3.1.3.2 *Salmonella* sp. in compound feeding stuff: compulsory testing

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Mbandaka	S. Bere
Cattle										
Process control										
Final product	*)		batch	50 g	2	0				
Pigs										
Process control										
Final product										
Poultry										
Poultry (not specified)										
Process control										
Final product										
Poultry - Breeders										
Process control										
Final product										
Poultry - Layers										
Process control										
Final product	*)		batch	50 g	185	0				
Poultry - Broiler										
Process control										
Final product	*)		batch	50 g	136	2 **			2	1
Pet food										
Dog snacks (pigs ears, chewing bones)										

2.1.6. Salmonella serovars and phagetype distribution

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.

Table 3.3.3 Salmonella serovars in animals

Serovars	Cattle		Pigs		Poultry (Gallus gallus)		Poultry, other than Gallus gallus	
Source of isolates	monitor.	clinical	monitor.	clinical	monitor.	clinical	monitor.	clinical
Number of isolates in the laboratory N=		9		15	640		83	
Number of *Salmonella* isolates serotyped N=		9		15	640		83	
Number of isolates per serovar								
S. Enteritidis		1		1	338		0	
S. Typhimurium		4		2	50		6	
S. Infantis		0		1	36		1	
S. Montevideo		0			16		27	
S. Senftenberg		1			14		24	
S. Saintpaul		0			2		15	
S. Indiana		0			23		0	
S. Braenderup		0			43		0	
S. Hadar		0			20		0	
S. Mbandaka		0			17		1	
S. Kentucky		0			13		0	
S. Kottbus		0			13		1	
S. Virchow		0			10		0	
other serovars		3		11	45		8	

Isolates from poultry as well from monitoring as clinical isolates

Table 3.3.4 Salmonella serovars in food

Serovars	Beef	Pork	Poultry meat (Gallus gallus)	Poultry meat, other than fowl meat
Number of isolates in the laboratory N=	1	2	148	64
Number of *Salmonella* isolates serotype N=	1	2	148	64
Number of isolates per serovar				
S. Enteritidis	0	0	51	3
S. Typhimurium	0	0	3	15
S. Infantis	0	0	24	2
S. Indiana	0	0	18	1
S. Worthington	0	0	16	0
S. Kottbus	0	0	0	9
S. Saintpaul	0	0	1	7
S. Montevideo	0	0	1	6
other serovars	1	2	34	21

Table 3.3.9 *S.* Enteritidis phage types in humans

Phage types *S.* Enteritidis	Human
Number of isolates in the laboratory N=	**6076**
Number of isolates serotyped N=	**6076**
Number of isolates per type	
PT4	2472
PT8	1856
PT21	710
PT1	250
PT6	205
PT14b	136
RDNC	123
PT36	41
PT6a	25
PT3	22
PTU	22
PT13a	21
PT7	18
PT5a	18
PT34	17
PT1b	17
PT29	16
PT5	15
PT12	15
PT4b	13
PT1d	11
PT5c	8
PT23	7
PT21c	5
PT6b	5
PT2	4
PT11	3
PT37	3
PT44	3
PT15	2
PT42	2
PT1c	2
PT13	1
PT19	1
PT22	1
PT25	1
PT31	1
PT33	1
PT4a	1
PT5b	1
PT7a	1

Table 3.3.6 *S*. Enteritidis phage types in food

Phagetypes *S*. Enteritidis		Beef	Pork	Poultry meat (Gallus gallus)	Poultry meat, other than fowl meat
Number of isolates in the laboratory	N=	0	0	51	3
Number of *Salmonella* isolates serotyped	N=	0	0	51	3
Number of isolates per type					
PT 4				19	1
PT 21				19	
PT 8				3	
PT 1				2	
PT 6				1	
PT 7				1	
PT 13a				1	
PT 14b				1	
PT 4a				1	
PT 6a				1	
PT RDNC				1	2
PT U				1	

Table 3.3.5 *S*. Enteritidis phage types in animals

Phagetypes *S*. Enteritidis		Cattle		Pigs		Poultry (Gallus gallus)		Poultry, other than Gallus gallus	
Source of isolates		monitor.	clinical	monitor.	clinical	monitor.	clinical	monitor.	clinical
Number of isolates in the laboratory	N=		1		1	338		0	
Number of *Salmonella* isolates serotyped	N=		1		1	338		0	
Number of isolates per type									
PT4						110			
PT8			1		1	90			
PT21						46			
PT7						29			
PT36						18			
PT23						16			
PT1						9			
PT6						7			
RDNC						5			
PT29						2			
PT2						1			
PT14b						1			
PT4b						1			
PT6a						1			
PT7a						1			
PTU						1			

Isolates from poultry as well from monitoring as clinical isolates

Table 3.3.10 *S.* Typhimurium phage types in humans

Phage types *S.* Typhimurium		Humans
Number of isolates in the laboratory	**N=**	**697**
Number of isolates serotyped	**N=**	**697**
Number of isolates per type		
DT46		218
DTU291		110
RDNC		85
DT104L		49
DTU		47
DT120		47
DT3		20
DT1		19
DT193		15
DT8		14
DT41		13
DT104H		12
DT85		11
DTU302		7
DT141		5
DT12		4
DT2		4
DT22		2
DT10		2
DT30		2
DT99		2
DT208		2
DT4		1
DT7		1
DT29		1
DT13		1
DT114		1
DT192		1
DT66A		1

Table 3.3.8 *Salmonella* Typhimurium phage types in food

Phage types *S*. Typhimurium		Beef	Pork	Poultry meat (Gallus gallus)	Poultry meat, other than fowl meat
Number of isolates in the laboratory	**N=**	0	0	3	15
Number of *Salmonella* isolates serotyped	**N=**	0	0	3	15
Number of isolates per type					
DT120				1	1
DT104L				1	2
RDNC				1	2
DT8					1
DT30					5
DT85					1
DTU					3

Table 3.3.7 *Salmonella* Typhimurium phage types in animals

Phage types *S*.Typhimurium		Cattle		Pigs		Poultry (Gallus gallus)		Poultry, other than Gallus gallus	
Source of isolates		monitor.	clinical	monitor.	clinical	monitor.	clinical	monitor.	clinical
Number of isolates in the laboratory	**N=**		4		2	50		6	
Number of *Salmonella* isolates serotyped	**N=**		4		2	50		6	
Number of isolates per type									
RDNC						16		0	
DT10						9		0	
DT99						8		0	
DT46						5		3	
DT8						3		0	
DT104L			3		2	3		0	
DT3						2		1	
104H						2		0	
DT2						1		0	
DT41						1		0	
DT120			1			0		2	

2.1.7. Antimicrobial resistance in Salmonella isolates

Antimicrobial resistance is the ability of certain microorganisms to survive or grow in the presence of a given concentration of antimicrobial agent that usually would kill or inhibit the microorganism species in question. Antimicrobial resistant *Salmonella* strains may be transferred from animals or foodstuffs to humans.

A. Antimicrobial resistance of *Salmonella* spp. in animal

Sampling strategy used in monitoring

Frequency of the sampling

All *Salmonella* isolated in veterinary laboratories were sent to NRL-S and susceptibility testing were performed.

Type of specimen taken

See chapter *Salmonella* in animal species

Methods of sampling (description of sampling techniques)

See chapter *Salmonella* in animal species

Procedures for the selection of isolates for antimicrobial testing

All *Salmonella* isolates from animals are tested in the NRL-S

Laboratory methodology used for identification of the microbial isolates

See chapter *Salmonella* in animal species

Laboratory used for detection for resistance

National Reference Laboratory for Salmonella, AGES Graz

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

Resistance monitoring was started in Austria in 2004.

Suggestions to the Community for the actions to be taken

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

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

No valid data available for comparison

Additional information

Nil

Table 3.2.6 Breakpoints for antibiotic resistance of *Salmonella* spp.

Test method used	
Disc diffusion	X
E-test	
Agar dilution	
Broth dilution	

Number of reporting laboratory	1

Standards used for testing	
NCCLS	X
other	

The methods are used for investigation of isolates from	
Feedingstuff	X
Animals	X
Food	X
Humans	X

	Dilution method					Diffusion method			
	Breakpoint concentration (µg/ml)			Range tested concentration (µg/ml)		Disk content	Breakpoint Zone diameter (mm)		
***Salmonella* spp.**	Susceptible <=	Intermediate	Resistant >	lowest	highest	µg	Susceptible >=	Intermediate	Resistant <=
Tetracycline						30µg	= 19	15 - 18	= 14
Phenicol									
Chloramphenicol						30µg	= 18	13 - 17	= 12
ß-Lactam									
Ampicillin						10µg	= 17	14 - 16	= 13
Cephalosporins									
Cefotaxim						30µg	= 23	15 - 22	= 14
Fluoroquinolones									
Ciprofloxacin [2]						5µg	= 21	16 - 20	= 15
Quinolones									
Nalidixic acid						30µg	= 19	14 - 18	= 13
Sulfonamides									
Trimethoprim [3](TMP)						5µg	= 16	11 - 15	= 10
Sulfonamide						300µg	= 17	13 - 16	= 12
Aminoglycosides									
Streptomycin						10µg	= 15	12 - 14	= 11
Gentamicin						10µg	= 15	13 - 14	= 12
Kanamycin [2]						30µg	= 18	14 - 17	= 13

Table 3.2.5.1 Antimicrobial susceptibility testing of *Salmonella* spp. in humans, food and animals

	human		*Salmonella* spp. from food								Salmonella spp. from animals							
			Beef		Pork		Poultry meat Gallus gallus		Poultry meat other		Cattle		Pigs		Poultry Gallus gallus		Turkeys	
Isolates out of a monitoring programme (Yes / no)	no		no		no		no		no		no		no		yes and no		no	
Number of isolates available in the laboratory	7286		1		2		148		64		9		15		640		83	
Antimicrobials:	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R
Tetracycline	284	3,9	0	0	0	0	26	17,6	23	35,9	4	44,4	6	40	49	7,7	7	8,4
Chloramphenicol	0	1,4	0	0	0	0	4	2,7	7	10,9	3	33,3	2	13,3	5	0,8	0	0
ß-Lactam																		
Ampicillin	328	4,5	0	0	0	0	13	8,8	14	21,9	3	33,3	3	20	46	7,2	9	10,8
Cephalosporins																		
Cefotaxim	7	0,1	0	0	0	0	2	1,4	0	0	0	0	0	0	0	0	0	0
Fluoroquinolones																		
Ciprofloxacin	7	0,1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quinolones																		
Nalidixic acid	357	4,9	0	0	1	50	28	18,9	21	32,8	0	0	3	20	50	7,8	8	9,6
Sulfonamides																		
Trimethoprim	87	1,2	0	0	0	0	7	4,7	9	14,1	0	0	1	6,7	6	0,9	0	0
Sulfonamide	262	3,6	0	0	0	0	21	14,2	15	23,4	3	33,3	7	46,7	22	3,4	10	12
Aminoglycosides																		
Streptomycin	270	3,7	0	0	0	0	23	15,5	21	32,8	3	33,3	6	40	56	8,8	18	21,7
Gentamicin	36	0,5	0	0	0	0	0	0	5	7,8	0	0	0	0	10	1,6	13	15,7
Kanamycin	29	0,4	0	0	0	0	6	4,1	8	12,5	0	0	0	0	14	2,2	10	12
Number of multiresistant isolates	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R
fully sensitive	6576	90,3	1	100	1	50	110	85,6	29	69,9	5	55,6	7	46,7	548	85,6	58	69,9
resistant to 1 antimicrobial	395	5,4			1	50	8	5,5	10	7,2	1	11,1			35	5,5	6	7,2
resistant to 2 antimicrobials	27	0,4					1	0,8	5	6,0					5	0,8	5	6,0
resistant to 3 antimicrobials	51	0,7					4	0,6	5	4,8			1	6,7	4	0,6	4	4,8
resistant to 4 antimicrobials	99	1,4					21	6,1	6	3,6			2	13,3	39	6,1	3	3,6
resistant to >4 antimicrobials	138	1,9					4	1,4	9	8,4	3	33,3	5	33,3	9	1,4	7	8,4

Table 3.2.5.2 Antimicrobial susceptibility testing of *S.* Enteritidis in humans, food and animals

			S. Enteritidis from food								S. Enteritidis from animals							
	human		Beef		Pork		Poultry meat Gallus gallus		Poultry meat other		Cattle		Pigs		Poultry Gallus gallus		Turkeys	
Isolates out of a monitoring programme (Yes / no)	no						no		no		no		no		yes and no		no	
Number of isolates available in the laboratory	6076		0		0		51		3		1		1		338		0	
Antimicrobials:	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R
Tetracycline	43	0,7					1	1,9	0	0	0	0	0	0	3	0,9		
Chloramphenicol	6	0,1					0	0	0	0	0	0	0	0	0	0		
ß-Lactam																		
Ampicillin	109	1,8					4	7,8	0	0	0	0	0	0	0	0		
Cephalosporins																		
Cefotaxim	0	0,0					2	3,9	0	0	0	0	0	0	0	0		
Fluoroquinolones																		
Ciprofloxacin	0	0					0	0	0	0	0	0	0	0	0	0		
Quinolones																		
Nalidixic acid	243	4					5	9,8	0	0	0	0	0	0	8	2,4		
Sulfonamides																		
Trimethoprim	24	0,4					0	0	0	0	0	0	0	0	0	0		
Sulfonamide	43	0,7					1	1,9	0	0	0	0	0	0	3	0,9		
Aminoglycosides																		
Streptomycin	30	0,5					1	1,9	0	0	0	0	0	0	3	0,9		
Gentamicin	6	0,1					0	0	0	0	0	0	0	0	3	0,9		
Kanamycin	6	0,1					0	0	0	0	0	0	0	0	0	0		
Number of multiresistant isolates	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R
fully sensitive	5701	93,8					42	92,9	3	100	1	100	1	100	314	92,9		
resistant to 1 antimicrobial	323	5,3					6	6,2							21	6,2		
resistant to 2 antimicrobials	7	0,1					1	0,0										
resistant to 3 antimicrobials	22	0,4					2	0,0										
resistant to 4 antimicrobials	15	0,2													3	0,9		
resistant to >4 antimicrobials	8	0,1																

Table 3.2.5.3 Antimicrobial susceptibility testing of *S.* Typhimurium in humans, food and animals

	human		S. Typhimurium in food								S. Typhimurium in animals							
			Beef		Pork		Poultry meat Gallus gallus		Poultry meat other		Cattle		Pigs		Poultry Gallus gallus		Turkeys	
Isolates out of a monitoring programme (Yes / no)	no						no		no		no		no		yes and no		no	
Number of isolates available in the laboratory	697		0		0		3		15		4		2		50		3	
Antimicrobials:	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R
Tetracycline	145	20,8					1	33,3	7	46,7	4	100	2	100	7	14	0	0
Chloramphenicol	72	10,3					1	33,3	2	13,3	3	75	2	100	3	6	0	0
ß-Lactam																		
Ampicillin	157	22,5					1	33,3	5	33,3	3	75	2	100	4	8	0	0
Cephalosporins																		
Cefotaxim	2	0,3					0	0	0	0	0	0	0	0	0	0	0	0
Fluoroquinolones																		
Ciprofloxacin	0	0					0	0	0	0	0	0	0	0	0	0	0	0
Quinolones																		
Nalidixic acid	26	3,7					0	0	3	20	0	0	0	0	0	0	0	0
Sulfonamides																		
Trimethoprim	27	3,9					0	0	3	20	0	0	0	0	1	2	0	0
Sulfonamide	155	22,2					1	33,3	8	53,3	3	75	2	100	7	14	0	0
Aminoglycosides																		
Streptomycin	145	20,8					1	33,3	8	53,3	3	75	2	100	6	12	0	0
Gentamicin	12	1,7					0	0	1	6,7	0	0	0	0	3	6	0	0
Kanamycin	2	0,3					0	0	1	6,7	0	0	0	0	3	6	0	0
Number of multiresistant isolates	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R
fully sensitive	512	73,5					2	86,0	7	46,7					43	86	3	100
resistant to 1 antimicrobial	27	3,9									1	25						
resistant to 2 antimicrobials	6	0,9							1	6,7								
resistant to 3 antimicrobials	14	2,0																
resistant to 4 antimicrobials	46	6,6							3	20,0					1	2		
resistant to >4 antimicrobials	92	13,2					1	12,0	4	26,7	3	75	2	100	6	12		
Number of multiresistant DT104	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R	N	% R
with penta resistance											3	75	2	100	3	6		
resistant to other antimicrobials															3	6		

Table 3.2.5.4 Antimicrobial susceptibility testing of *S.* Infantis in animals

	***S.* Infantis**							
	Cattle		Pigs		Poultry Gallus gallus		Turkeys	
Isolates out of a monitoring programme (Yes / no)	no		no		yes and no		no	
Number of isolates available in the laboratory	0		1		36		1	
Antimicrobials:	N	% R	N	% R	N	% R	N	% R
Tetracycline			0	0	7	19,4	0	0
Chloramphenicol			0	0	0	0	0	0
ß-Lactam								
Ampicillin			0	0	0	0	0	0
Cephalosporins								
Cefotaxim			0	0	0	0	0	0
Fluoroquinolones								
Ciprofloxacin			0	0	0	0	0	0
Quinolones								
Nalidixic acid			0	0	7	19,4	0	0
Sulfonamides								
Trimethoprim			0	0	1	2,8	0	0
Sulfonamide			0	0	8	22,2	0	0
Aminoglycosides								
Streptomycin			0	0	7	19,4	0	0
Gentamicin			0	0	0	0	0	0
Kanamycin			0	0	0	0	0	0
Number of multiresistant isolates	N	% R	N	% R	N	% R	N	% R
fully sensitive			1	100	27	75	1	100
resistant to 1 antimicrobial					2	5,6		
resistant to 2 antimicrobials								
resistant to 3 antimicrobials								
resistant to 4 antimicrobials					7	19,4		
resistant to >4 antimicrobials								

Table 3.2.5.5 Antimicrobial susceptibility testing of other *Salmonella* - serovars isolated from food

	other serotypes							
	Beef		Pork		Poultry meat Gallus gallus		Poultry meat other	
Isolates out of a monitoring programme (Yes / no)	no		no		no		no	
Number of isolates available in the laboratory	1		2		94		46	
Antimicrobials:	N	% R	N	% R	N	% R	N	% R
Tetracycline	0	0	0	0	24	25,5	16	34,8
Chloramphenicol	0	0	0	0	3	3,2	5	10,9
ß-Lactam								
Ampicillin	0	0	0	0	8	8,5	9	19,6
Cephalosporins								
Cefotaxim	0	0	0	0	0	0,0	0	0
Fluoroquinolones								
Ciprofloxacin	0	0	0	0	0	0	0	0
Quinolones								
Nalidixic acid	0	0	1	50	23	24,5	18	39,1
Sulfonamides								
Trimethoprim	0	0	0	0	7	7,4	6	13
Sulfonamide	0	0	0	0	19	20,2	7	15,2
Aminoglycosides								
Streptomycin	0	0	0	0	21	22,3	13	28,3
Gentamicin	0	0	0	0	0	0	4	8,7
Kanamycin	0	0	0	0	6	6,4	7	15,2
Number of multiresistant isolates	N	% R	N	% R	N	% R	N	% R
fully sensitive	1	100	1	50	66	70,2	19	41,3
resistant to 1 antimicrobial			1	50	2	2,1	10	21,7
resistant to 2 antimicrobials							4	8,7
resistant to 3 antimicrobials					2	2,1	5	10,9
resistant to 4 antimicrobials					21	22,3	3	6,5
resistant to >4 antimicrobials					3	3,2	5	10,9

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, but less frequently reported than salmonellosis. In 2004, 2 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 major 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 according to the directive 2003/99/EC of the European Parliament and the Council of 17 November 2003 in the National Order GZ: 39.514/85-IV/B/8/04 (Zoonosenüberwachungs-programme gemäß RL 2003/99/EG; Durchführung von einheitlichen Überwachungsprogrammen zu ausgewählten Zoonosen sowie diesbezüglicher Antibiotikaresistenzen). The sampling was carried out from 14 May to 26 November 2004 and follow up programs will be realized in the following 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. Campylobacteriosis in humans

A. Thermophilic Campylobacter in humans

Case definition

Clinical picture compatible with campylobacteriosis, e.g.: diarrheal illness of variable severity and isolation of *Campylobacter* spp. from stool.

Diagnostic/analytical methods used

Stool samples are plated on selective media and incubated in microaerobic atmosphere at 37-42°C for a minimum of 36 hours (Anonymus: Standardisierung und Qualitätssicherung in der mikrobiologischen Diagnostik. Richtlinien. Bundesministerium für Soziale Sicherheit und Generationen. ISBN 3-84123-126-0, Wien, 2001, pg. 13). *Campylobacter* is confirmed by observing the typical colony morphology and characteristic motility and morphology under the microscope. For typing and differentiation of isolates to species level the production of catalase and oxidase, the reaction in hippurate and indoxylacetate-hydrolysis is performed. The differentiation to species-level is not performed in each laboratory.

Notification system in place

Notification of campylobacteriosis since 1996 according to the epidemic act (BGBl. 1950/186 Epidemiegesetz, as amended): Primarily the attending physicians have to notify. Since 2002 an order has been implemented (Meldepflicht infektiöser Erkrankungen für Labors GZ: 21.700/5-VIII/D/5/02), in which medical doctors specialised in Laboratory Diagnosis or Microbiology and Hygiene are subjected to notification.

History of the disease and/or infection in the country

Since 1996 there is a consistent increase in notifications of human campylobacteriosis cases except for 2003.

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

Following the number of notifications per year campylobacteriosis is the second frequently notified enteric disease with increasing tendency and closer approach to the number of notified salmonellosis cases. One reason therefore is the improvement of the notification system. In the year 2004 there was a significant increase (+36.8%) in reported cases of campylobacteriosis throughout Austria. The main sources of infections seem to be chicken meat and raw milk (Feierl G. 2005. Jahresbericht 2004 der Nationalen Referenzzentrale für Campylobacter. Mitteilungen der Sanitätsverwaltung 4/2005, in press).

Relevance as zoonotic disease

Due to the fact that epidemiological data are unclear, campylobacteriosis is the second frequently notified zoonosis followed by salmonellosis.

Additional information

As regards antibiotic resistance, no substantial change has been observed compared to the last three years. Resistance rates to Quinolones are at 40%, to Tetracyclines at 20%; resistance rates to Macrolides (2%) are still reasonable (Feierl G. 2005. Jahresbericht 2004 der Nationalen Referenzzentrale für Campylobacter. Mitteilungen der Sanitätsverwaltung 4/2005, in press).

Table 6.3.A Campylobacteriosis in man - species/serotype distribution

	Cases	Incidence per 100.000
Campylobacteriosis	6222	76,44
C. jejuni	1877	23,06
C. coli	128	1,57
not differentiated	4217	51,81

Table 6.3.B Campylobacteriosis in man - age distribution

	Campylobacter sp.			*C. jejuni*			*C. coli*		
Age group	**All**	**M**	**F**	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year	102	61	41	32	19	13	1	1	0
1 to 4 years	527	291	236	157	94	63	4	0	4
5 to 14 years	684	398	286	210	125	85	10	6	4
15 to 24 years	812	439	373	303	173	130	20	9	11
25 to 44 years	1.278	704	574	524	304	220	37	23	14
45 to 64 years	743	410	333	307	183	124	31	10	21
65 years and older	534	263	271	189	97	92	21	7	14
Age unknown	1.542			155			4		
All age groups	6.222	2.566	2.114	1.877	995	727	128	56	68

Table 6.3.C Campylobacteriosis in man - seasonal distribution

Month	Campylobacter	*C.jejuni*	*C.coli*	*C.upsaliensis*
	Cases	Cases	Cases	Cases
January	310	99	5	0
February	205	53	6	0
March	283	72	9	0
April	451	143	11	0
May	551	191	10	0
June	605	238	7	0
July	601	219	15	0
August	529	190	13	0
September	664	197	22	0
October	543	190	11	0
November	566	195	9	0
December	324	90	10	0
not known	590			
Total	6.222	1.877	128	0

2.2.3. Campylobacter in foodstuffs

A. Campylobacter, thermophilic in food - all foodstuffs - official food or feed controls

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 AV 31.912/16-IV/B/10/03 of 22.12.2003).

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

Thermophilic *Campylobacter* 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. *Campylobacter*-like colonies were identified by serology, observing their characteristic motility and morphology under the microscope and the production of catalase and oxidase.

Table 6.2 Thermophilic *Campylobacter* spp. in food

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Thermophilic *Campylobacter* sp.	*C. jejuni*	*C. coli*	*C. lari*	*C. upsaliensis*
Broiler meat and products thereof										
Broiler meat fresh										
at slaughterhouse										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	412	217	29	6		
Broiler meat - meat products										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	29	4				
at processing plant										
Other poultry meat and products thereof										
Other poultry meat, fresh										
at slaughterhouse										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	113	21	4	1		
Other poultry meat - meat products										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	4	0				
Pig meat and product thereof										
Pig meat - fresh										
at slaughterhouse										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	17	0				
Pig meat - meat products										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	89	2				
Bovine meat and products thereof										
Bovine meat fresh										
at slaughterhouse										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	34	1				
Bovine meat - meat products										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	60	0				
Milk and milk products										
Milk, raw			sample	25/50 g	31	0				
Ready to eat milk products			sample	25/50 g	255	0				
Fish and fish products										
Fish products			sample	25/50 g	28	0				
Other meat products										
Other fresh meat										
at slaughterhouse										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	1	0				
Other animals or mixed products										
at processing plant										
at retail level (incl. at processing plant)			sample	25/50 g	42	1				
Other food			sample	25/50 g	227	0				

2.2.4. Campylobacter in animals

A. *Campylobacter* spp. in animal - Cattle (bovine animals) - at slaughter - monitoring programme - active monitoring

Monitoring system

Sampling strategy

Monitoring program on the occurrence and trend of antimicrobial resistance in *Campylobacter* based on the prevalence of campylobacter in slaughtered animals: At an estimated prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 326 *Campylobacter* isolates from bovine animals were required.

To obtain this number of isolates, as sample size, 980 slaughtered bovine animals had to be tested, calculated on approximately 600.000 slaughtered bovine animals in 2002 in Austria, with an estimated *Campylobacter*-prevalence of 30% by 95% confidence and 5% type one error. 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 75 abattoirs in which more than 500 bovine animals were slaughtered in 2002 accounted for more than 95% of the total annual bovine production. Sampling was performed in the 43 of the 75 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 32 samplings were distributed over the 43 abattoirs.

Frequency of the sampling

Detection of annual prevalence of 30 % by 95% confidence and 5% type one error.

Type of specimen taken

Other: Colon containing 50 to 100 grams of feces

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 plastik 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*.

Case definition

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

Diagnostic/analytical methods used

Approximately 1 gram of content of the colon was enriched in Preston bouillon in a 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 C. *jejuni* and *C. coli*.

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 notifyable in bovine animals

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

18.6% of slaughtered bovine animals are infected with *Campylobacter jejuni* or *C. coli*. Compared to 64.8% of poultry slaughter batches or 57.5% of slaughtered pigs positive for campylobacter, it seems that the risk for humans to get infected after consumption of beef or veal remains of little relevance.

B. *Campylobacter* spp. in animal - Poultry - at slaughter – monitoring programme - active monitoring (slaughter batch)

Monitoring system

Sampling strategy

Monitoring program on the occurrence and trend of antimicrobial resistance in *Campylobacter* based on the prevalence of *Campylobacter* in slaughter batches: At an estimated prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 385 *Campylobacter* isolates from poultry were required. To obtain this number of isolates, as a primary sample size, 770 slaughter batches of poultry had to be tested, calculated on approximately 8000 slaughter batches of poultry in 2002 in Austria, with an estimated prevalence of 50% by 95% confidence and 5% type one error. Caeca of 10 animals as the secondary sample size that gives the number of birds per batch to be sampled had been

assessed 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 all 8 poultry slaughter plants with slaughter batches consisting of >2000 animals in Austria. The 8 slaughter plants included in the surveillance 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 50 % by 95% confidence and 5% type one error.

Type of specimen taken

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 plastik 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*.

Case definition

At slaughter: A slaughter batch is considered to be infected with *Campylobacter jejuni* or *C. coli* following its isolation from the pooled sample.

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 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*.

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

64.8% of the slaughter batches/flocks are infected with campylobacter. In fact this prevalence exceeds the estimated prevalence of 50%. On the other hand it has to be stated that the monitoring has been carried out mainly in the summer month. In August and September the detection rate of campylobacter exceeded 72%.

C. *Campylobacter* spp. in animal - Pigs - at slaughter – monitoring programme - active monitoring

Monitoring system

Sampling strategy

Monitoring program on the occurrence and trend of antimicrobial resistance in *Campylobacter* based on the prevalence of *Campylobacter* in slaughtered animals: At an estimated prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 385 *Campylobacter* isolates from pigs were required.

To obtain this number of isolates, as sample size, 770 slaughtered pigs had to be tested, calculated on approximately 4.300.000 slaughtered pigs in 2002 in Austria, with an estimated *Campylobacter*-prevalence of 50% by 95% confidence and 5% type one error. 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 77 abattoirs in which more than 3.500 pigs were slaughtered in 2002 accounted for more than 95% of the total annual pig production. Sampling was performed in the 53 of the 77 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 24 samplings were distributed over the 53 abattoirs.

Frequency of the sampling

Detection of annual prevalence of 50 % by 95% confidence and 5% type one error.

Type of specimen taken

Other: Colon containing 50 to 100 grams of feces

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 plastik 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*.

Case definition

A pig is considered to be infected with *Campylobacter jejuni* or *C. coli* following *Campylobacter* isolation 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*.

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

57.5% of slaughtered pigs were infected with *Campylobacter jejuni* or *C. coli*. It seems interesting that the rate of infected slaughtered pigs varied from approx. 30% in June to 75% in September!

Table 6.1.1 Thermophilic *Campylobacter* spp. in animals

Animal species	Source of information	Remarks	Epidemiological unit	Units tested	Units positive for thermophilic *Campylobacter* sp.	*C. jejuni*	*C. coli*
Cattle							
Dairy cows							
unspecified, at slaughter			animals	898	167	146	21
Sheep							
Goats							
Pigs, at slaughter			animals	741	426	22	404
Solipeds							
Gallus Gallus							
Broilers - farm level							
Broilers - slaughterhouse							
Poultry at slaughter*			slaughter batch	661	428	258	170

* gallus gallus and turkey

2.2.5. Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in *Campylobacter jejuni* and *coli* in cattle

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 campylobacter strains obtained in the monitoring program have been tested.

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* strains were subcultivated on Columbia agar (bioMerieux) and incubated 48 hours at 42°C in a 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 a 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 (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data available for comparison

Additional information

Nil

B. Antimicrobial resistance in *Campylobacter jejuni* and *coli* in pigs

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

All *Campylobacter* strains obtained in the monitoring program have been tested.

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

The susceptibility testing was done with Sensititre® Microbiology Systems (MCS Diagnostics). The frozen *Campylobacter* strains were subcultivated on Columbia agar (bioMerieux) and incubated 48 hours at 42°C in a 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 a 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 (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data available for comparison

Additional information

Nil

C. Antimicrobial resistance in *Campylobacter jejuni* and *coli* in poultry

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 *Campylobacter* strains obtained in the monitoring program have been tested.

Laboratory methodology used for identification of the microbial isolates

Described in chapter: Thermophilic *Campylobacter* in poultry

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was done with Sensititre® Microbiology Systems (MCS Diagnostics). The frozen *Campylobacter* strains were subcultivated on Columbia agar (bioMerieux) and incubated 48 hours at 42°C in a 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 a 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 (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data of previous years available for comparison.

Additional information

Nil

Table 6.1.6 Breakpoints used for antimicrobial susceptibility testing of *Campylobacter* spp.

	animals					humans			
	Dilution method					Diffusion method			
	Breakpoint concentration (µg/ml)			Range tested concentration (µg/ml)		Disk content	Breakpoint Zone diameter (mm)		
Campylobacter spp.	Susceptible <=	Intermediate	Resistant >	lowest	highest	µg	Susceptible >=	Intermediate	Resistant <=
Tetracycline									
Tetracyclin			8	0,25	32	30	19	15-18	14
Phenicol									
Chloramphenicol			16	1	64				
ß-Lactam									
Ampicillin			16	0,5	32				
Ampicillin/Sulbactam (2:1)			16	0,25	32				
Fluoroquinolones									
Ciprofloxacin			2	0,03	16	5	21	16-20	15
Quinolones									
Nalidixic acid			32	1	128				
Aminoglycosides									
Gentamicin			8	0,25	32				
Neomycin			8	1	64				
Streptomycin			8	1	64				
Macrolides									
Erythromycin			16	0,25	32	15	23	14-22	13
Polymyxin									
Colistin			32	0,5	64				
Trimethoprim + Sulfonamide									
Trimethoprim/Sulfamethoxazol (1:19)			4	0,12	16				

Table 6.1.3 Antimicrobial susceptibility testing of *Campylobacter* spp. in humans

	Humans	
Isolates out of a monitoring programme (Yes / no)	no	
Antimicrobials:	N*)	% R
Tetracycline	3.628	20,6
Fluoroquinolones		
Ciprofloxacin	3.952	38,7
Macrolides		
Erythromycin	4.001	1,9

*) number of isolates tested

Table 6.1.2.1 Antimicrobial susceptibility testing of *Campylobacter* spp. in animals, qualitative data

	***Campylobacter* spp.**					
	Cattle		Pigs		Poultry (Gallus gallus and Turkeys)	
Isolates out of a monitoring programme (Yes / no)	yes		yes		yes	
Number of isolates available in the laboratory	143		361		346	
Antimicrobials:	N	% R	N	% R	N	% R
Tetracycline						
Tetracyclin	57	39,9	264	73,1	109	31,5
Phenicol						
Chloramphenicol	1	0,7	3	0,8	0	0,0
ß-Lactam						
Ampicillin	10	7,0	64	17,7	41	11,8
Ampicillin/Sulbactam (2:1)	1	0,7	23	6,4	2	0,6
Fluoroquinolones						
Ciprofloxacin	40	28,0	124	34,3	160	46,2
Quinolones						
Nalidixic acid	43	30,1	113	31,3	147	42,5
Aminoglycosides						
Gentamicin	0	0,0	6	1,7	1	0,3
Neomycin	0	0,0	9	2,5	2	0,6
Streptomycin	15	10,5	309	85,6	39	11,3
Macrolides						
Erythromycin	2	1,4	61	16,9	15	4,3
Polymyxin						
Colistin	0	0,0	3	0,8	1	0,3
Trimethoprim + Sulfonamide						
Trimethoprim/Sulfamethoxazol (1:19)	12	8,4	164	45,4	34	9,8
Number of multiresistant isolates	N	% R	N	% R	N	% R
fully sensitive	89	62,2	176	48,8	160	46,2
resistant to 1 antimicrobial	14	9,8	55	15,2	35	10,1
resistant to 2 antimicrobials	11	7,7	21	5,8	65	18,8
resistant to 3 antimicrobials	19	13,3	13	3,6	59	17,1
resistant to 4 antimicrobials	6	4,2	26	7,2	17	4,9
resistant to >4 antimicrobials	4	2,8	70	19,4	10	2,9

Table 6.1.2.2 Antimicrobial susceptibility testing of *Campylobacter* spp. in Cattle (bovine animals) - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***Campylobacter species* in pigs**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	143

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	57	39,9					53,1	3,5	0,7			2,8	4,2	4,9	30,8			
Phenicol																		
Chloramphenicol	1	0,7							51,7	40,6	7,0				0,7			
ß-Lactam																		
Ampicillin	10	7,0						12,6	13,3	25,9	30,1	10,5	0,7	3,5	3,5			
Ampicillin/Sulbactam (2:1)	1	0,7					2,8	11,9	17,5	37,1	21,0	5,6	3,5	0,7				
Fluoroquinolones																		
Ciprofloxacin	40	28,0		7,0	38,5	17,5	6,3	1,4		1,4	4,9	16,8	2,8	3,5				
Quinolones																		
Nalidixic acid	43	30,1								6,3	47,6	10,5	2,1	3,5	11,2	16,1	2,8	
Aminoglycosides																		
Gentamicin	0	0,0					71,3	26,6	2,1									
Neomycin	0	0,0							96,5	3,5								
Streptomycin	15	10,5							83,2	4,2	1,4	0,7	1,4	1,4	3,5	4,2		
Macrolides																		
Erythromycin	2	1,4					63,6	22,4	9,8	2,8					1,4			
Polymyxin																		
Colistin	0	0,0						8,4	16,8	37,1	31,5	4,9	1,4					
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	12	8,4				0,7	1,4	6,3	22,4	43,4	17,5	4,9	0,7	2,8				

Table 6.1.2.3 Antimicrobial susceptibility testing of *Campylobacter* spp. in pigs - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***Campylobacter species* in pigs**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	361

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	264	73,1					16,1	3,6	1,4	0,6	1,9	3,3	6,9	9,1	57,1			
Phenicol																		
Chloramphenicol	3	0,8							15,2	49,0	32,7	2,2		0,6		0,3		
ß-Lactam																		
Ampicillin	64	17,7						6,1	10,0	13,6	23,8	24,9	3,9	3,6	14,1			
Ampicillin/Sulbactam (2:1)	23	6,4					0,8	7,5	10,0	18,0	30,5	16,6	10,2	5,3	1,1			
Fluoroquinolones																		
Ciprofloxacin	124	34,3		6,1	28,0	24,4	3,6	0,8	0,3	2,5	9,4	19,1	4,4	1,4				
Quinolones																		
Nalidixic acid	113	31,3							1,7	2,2	23,5	27,7	8,3	5,3	14,1	15,0	2,2	
Aminoglycosides																		
Gentamicin	6	1,7					14,4	58,2	25,5	0,3				0,3	1,4			
Neomycin	9	2,5							56,9	39,2	1,4		0,8		0,6	1,1		
Streptomycin	309	85,6							2,8	5,3	2,8	3,6	1,1	13,3	51,2	19,9		
Macrolides																		
Erythromycin	61	16,9					4,4	23,0	24,9	21,1	8,3	0,8	0,6	0,8	16,1			
Polymyxin																		
Colistin	3	0,8						34,9	45,2	11,6	3,9	1,7	0,8	1,1	0,6	0,3		
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	164	45,4				2,5	4,7	10,5	18,0	13,3	5,5	5,0	11,9	28,5				

Table 6.1.2.4 Antimicrobial susceptibility testing of *Campylobacter* spp. in poultry - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***Campylobacter species* in poultry (slaughter batch)**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	346

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	109	31,5					60,4	2,6	2,0	0,6	0,6	2,3	2,0	4,6	24,9			
Phenicol																		
Chloramphenicol	0	0,0							41,9	44,5	13,3	0,3						
ß-Lactam																		
Ampicillin	41	11,8						9,0	10,7	22,5	27,7	16,2	2,0	6,4	5,5			
Ampicillin/Sulbactam (2:1)	2	0,6					2,6	9,8	14,2	28,0	25,7	15,9	3,2	0,6				
Fluoroquinolones																		
Ciprofloxacin	160	46,2		3,2	24,6	19,7	2,6	0,9	0,9	2,0	16,5	22,8	5,2	1,7				
Quinolones																		
Nalidixic acid	147	42,5								4,9	32,9	10,1	2,9	6,6	21,4	18,2	2,9	
Aminoglycosides																		
Gentamicin	1	0,3					59,8	35,3	4,6					0,3				
Neomycin	2	0,6							91,6	7,2		0,6	0,3		0,3			
Streptomycin	39	11,3							77,2	9,2	2,0	0,3	0,9	2,9	4,9	2,6		
Macrolides																		
Erythromycin	15	4,3					57,5	24,0	8,4	4,6	0,9		0,3		4,3			
Polymyxin																		
Colistin	1	0,3						14,7	31,2	30,1	19,7	3,2	0,9			0,3		
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	34	9,8				0,9	1,4	7,5	25,1	37,0	18,2	2,3	1,7	5,8				

Table 6.1.2.5 Antimicrobial susceptibility testing of *C. jejuni* - qualitative data

	Campylobacter jejuni					
	Cattle		Pigs		Poultry (Gallus gallus and Turkeys)	
Isolates out of a monitoring programme (Yes / no)	yes		yes		yes	
Number of isolates available in the laboratory	126		15		211	
Antimicrobials:	N	% R	N	% R	N	% R
Tetracycline						
Tetracyclin	48	38,1	12	80,0	56	26,5
Phenicol						
Chloramphenicol	1	0,8	0	0,0	0	0,0
ß-Lactam						
Ampicillin	9	7,1	1	6,7	29	13,7
Ampicillin/Sulbactam (2:1)	1	0,8	0	0,0	0	0,0
Fluoroquinolones						
Ciprofloxacin	32	25,4	2	13,3	78	37,0
Quinolones						
Nalidixic acid	34	27,0	1	6,7	76	36,0
Aminoglycosides						
Gentamicin	0	0,0	0	0,0	0	0,0
Neomycin	0	0,0	1	6,7	0	0,0
Streptomycin	9	7,1	13	86,7	7	3,3
Macrolides						
Erythromycin	1	0,8	6	40,0	2	0,9
Polymyxin						
Colistin	0	0,0	0	0,0	0	0,0
Trimethoprim + Sulfonamide						
Trimethoprim/Sulfamethoxazol (1:19)	7	5,6	8	53,3	12	5,7
Number of multiresistant isolates	N	% R	N	% R	N	% R
fully sensitive	83	65,9	7	46,7	119	56,4
resistant to 1 antimicrobial	12	9,5	7	46,7	16	7,6
resistant to 2 antimicrobials	9	7,1	0	0	32	15,2
resistant to 3 antimicrobials	14	11,1	0	0	32	15,2
resistant to 4 antimicrobials	6	4,8	0	0	9	4,3
resistant to >4 antimicrobials	2	1,6	1	6,7	3	1,4

Table 6.1.2.6 Antimicrobial susceptibility testing of *Campylobacter jejuni* in Cattle (bovine animals) - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***Campylobacter jejuni* in cattle**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	126

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	48	38,1					55,6	3,2	0,8			2,4	3,2	5,6	29,4			
Phenicol																		
Chloramphenicol	1	0,8							56,3	35,7	7,1				0,8			
ß-Lactam																		
Ampicillin	9	7,1						13,5	11,9	26,2	30,2	10,3	0,8	4,0	3,2			
Ampicillin/Sulbactam (2:1)	1	0,8					3,2	12,7	15,9	38,9	20,6	4,8	3,2	0,8				
Fluoroquinolones																		
Ciprofloxacin	32	25,4		6,3	39,7	19,0	7,1	1,6		0,8	4,8	15,9	2,4	2,4				
Quinolones																		
Nalidixic acid	34	27,0								7,1	50,0	10,3	2,4	3,2	7,9	16,7	2,4	
Aminoglycosides																		
Gentamicin	0	0,0					75,4	24,6										
Neomycin	0	0,0							98,4	1,6								
Streptomycin	9	7,1							88,1	3,2	0,8	0,8	1,6	1,6	1,6	2,4		
Macrolides																		
Erythromycin	1	0,8					65,9	22,2	8,7	2,4					0,8			
Polymyxin																		
Colistin	0	0,0						5,6	15,1	38,1	34,9	4,8	1,6					
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	7	5,6				0,8	1,6	6,3	23,0	44,4	18,3	4,0	0,8	0,8				

Table 6.1.2.7 Antimicrobial susceptibility testing of *Campylobacter jejuni* in pigs - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***Campylobacter jejuni* in pigs**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	15

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	12	80,0					20,0						6,7	6,7	66,7			
Phenicol																		
Chloramphenicol	0	0,0							6,7	66,7	20,0	6,7						
ß-Lactam																		
Ampicillin	1	6,7						6,7	13,3	6,7	40,0	20,0	6,7		6,7			
Ampicillin/Sulbactam (2:1)	0	0,0						6,7	13,3	26,7	26,7	20,0	6,7					
Fluoroquinolones																		
Ciprofloxacin	2	13,3		6,7	26,7	46,7	6,7				6,7	6,7						
Quinolones																		
Nalidixic acid	1	6,7									26,7	33,3	26,7	6,7	6,7			
Aminoglycosides																		
Gentamicin	0	0,0					13,3	46,7	40,0									
Neomycin	1	6,7							46,7	40,0	6,7				6,7			
Streptomycin	13	86,7								6,7	6,7			13,3	66,7	6,7		
Macrolides																		
Erythromycin	6	40,0						13,3	26,7	20,0					40,0			
Polymyxin																		
Colistin	0	0,0						46,7	40,0		6,7	6,7						
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	8	53,3					6,7	6,7	6,7	20,0	6,7	13,3	13,3	26,7				

Table 6.1.2.8 Antimicrobial susceptibility testing of *Campylobacter jejuni* in poultry - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

Campylobacter jejuni **in poultry (slaughter batch)**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	211

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	56	26,5					65,4	3,3	1,4	0,9	0,5	1,9	0,9	4,3	21,3			
Phenicol																		
Chloramphenicol	0	0,0							56,4	36,0	7,6							
ß-Lactam																		
Ampicillin	29	13,7						12,3	9,5	28,9	25,1	8,1	2,4	9,0	4,7			
Ampicillin/Sulbactam (2:1)	0	0,0					2,8	12,8	14,7	37,4	17,1	13,7	1,4					
Fluoroquinolones																		
Ciprofloxacin	78	37,0		2,8	28,4	25,1	3,3	1,4	0,5	1,4	10,0	20,4	4,7	1,9				
Quinolones																		
Nalidixic acid	76	36,0								6,2	39,8	11,4	2,4	4,3	10,9	21,3	3,8	
Aminoglycosides																		
Gentamicin	0	0,0					74,9	22,3	2,8									
Neomycin	0	0,0							95,7	3,8		0,5						
Streptomycin	7	3,3							89,6	5,2	1,4	0,5		0,9	1,9	0,5		
Macrolides																		
Erythromycin	2	0,9					68,2	22,7	5,7	1,4	0,5		0,5		0,9			
Polymyxin																		
Colistin	0	0,0						2,8	23,2	41,2	27,0	4,7	0,9					
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	12	5,7				0,5	0,9	6,2	24,2	42,7	19,9	2,4	1,4	1,9				

Table 6.1.2.9 Antimicrobial susceptibility testing of *C. coli* - qualitative data

	Campylobacter coli					
	Cattle		Pigs		Poultry (Gallus gallus and Turkeys)	
Isolates out of a monitoring programme (Yes / no)	yes		yes		yes	
Number of isolates available in the laboratory	17		346		135	
Antimicrobials:	N	% R	N	% R	N	% R
Tetracycline						
Tetracyclin	9	52,9	252	72,8	53	39,3
Phenicol						
Chloramphenicol	0	0,0	3	0,9	0	0,0
ß-Lactam						
Ampicillin	1	5,9	63	18,2	12	8,9
Ampicillin/Sulbactam (2:1)	0	0,0	23	6,6	2	1,5
Fluoroquinolones						
Ciprofloxacin	8	47,1	122	35,3	82	60,7
Quinolones						
Nalidixic acid	9	52,9	112	32,4	71	52,6
Aminoglycosides						
Gentamicin	0	0,0	6	1,7	1	0,7
Neomycin	0	0,0	8	2,3	2	1,5
Streptomycin	6	35,3	296	85,5	32	23,7
Macrolides						
Erythromycin	1	5,9	55	15,9	13	9,6
Polymyxin						
Colistin	0	0,0	3	0,9	1	0,7
Trimethoprim + Sulfonamide						
Trimethoprim/Sulfamethoxazol (1:19)	5	29,4	156	45,1	22	16,3
Number of multiresistant isolates	N	% R	N	% R	N	% R
fully sensitive	6	35,3	169	48,8	41	30,4
resistant to 1 antimicrobial	2	11,8	48	13,9	19	14,1
resistant to 2 antimicrobials	2	11,8	21	6,1	33	24,4
resistant to 3 antimicrobials	5	29,4	13	3,8	27	20,0
resistant to 4 antimicrobials	0	0	26	7,5	8	5,9
resistant to >4 antimicrobials	2	11,8	69	19,9	7	5,2

Table6.1.2.10 Antimicrobial susceptibility testing of *Campylobacter coli* in Cattle (bovine animals) - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***Campylobacter coli* in cattle**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	17

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	9	52,9					35,3	5,9				5,9	11,8		41,2			
Phenicol																		
Chloramphenicol	0	0,0							17,6	76,5	5,9							
ß-Lactam																		
Ampicillin	1	5,9						5,9	23,5	23,5	29,4	11,8			5,9			
Ampicillin/Sulbactam (2:1)	0	0,0						5,9	29,4	23,5	23,5	11,8	5,9					
Fluoroquinolones																		
Ciprofloxacin	8	47,1		11,8	29,4	5,9				5,9	5,9	23,5	5,9	11,8				
Quinolones																		
Nalidixic acid	9	52,9									29,4	11,8		5,9	35,3	11,8	5,9	
Aminoglycosides																		
Gentamicin	0	0,0					41,2	41,2	17,6									
Neomycin	0	0,0							82,4	17,6								
Streptomycin	6	35,3							47,1	11,8	5,9				17,6	17,6		
Macrolides																		
Erythromycin	1	5,9					47,1	23,5	17,6	5,9					5,9			
Polymyxin																		
Colistin	0	0,0						29,4	29,4	29,4	5,9	5,9						
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	5	29,4						5,9	17,6	35,3	11,8	11,8		17,6				

Table 6.1.2.11 Antimicrobial susceptibility testing of *Campylobacter coli* in pigs - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***Campylobacter coli* in pigs**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	346

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	252	72,8					15,9	3,8	1,4	0,6	2,0	3,5	6,9	9,2	56,6			
Phenicol																		
Chloramphenicol	3	0,9							15,6	48,3	33,2	2,0		0,6		0,3		
ß-Lactam																		
Ampicillin	63	18,2						6,1	9,8	13,9	23,1	25,1	3,8	3,8	14,5			
Ampicillin/Sulbactam (2:1)	23	6,6					0,9	7,5	9,8	17,6	30,6	16,5	10,4	5,5	1,2			
Fluoroquinolones																		
Ciprofloxacin	122	35,3		6,1	28,0	23,4	3,5	0,9	0,3	2,6	9,5	19,7	4,6	1,4				
Quinolones																		
Nalidixic acid	112	32,4							1,7	2,3	23,4	27,5	7,5	5,2	14,5	15,6	2,3	
Aminoglycosides																		
Gentamicin	6	1,7					14,5	58,7	24,9	0,3				0,3	1,4			
Neomycin	8	2,3							57,4	39,1	1,2		0,9		0,3	1,2		
Streptomycin	296	85,5							2,9	5,2	2,6	3,8	1,2	13,3	50,6	20,5		
Macrolides																		
Erythromycin	55	15,9					4,6	23,4	24,9	21,1	8,7	0,9	0,6	0,9	15,0			
Polymyxin																		
Colistin	3	0,9						34,4	45,4	12,1	3,8	1,4	0,9	1,2	0,6	0,3		
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	156	45,1				2,6	4,6	10,7	18,5	13,0	5,5	4,6	11,8	28,6				

Table 6.1.2.12 Antimicrobial susceptibility testing of *Campylobacter coli* in poultry - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

Campylobacter coli **in poultry (slaughter batch)**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	135

Agar diffusion	
Agar dilution	
Broth dilution	X

Antimicrobials:	n resistant	% resistant	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512
Tetracycline																		
Tetracyclin	53	39,3					52,6	1,5	3,0		0,7	3,0	3,7	5,2	30,4			
Phenicol																		
Chloramphenicol	0	0,0							19,3	57,8	22,2	0,7						
ß-Lactam																		
Ampicillin	12	8,9						3,7	12,6	12,6	31,9	28,9	1,5	2,2	6,7			
Ampicillin/Sulbactam (2:1)	2	1,5					2,2	5,2	13,3	13,3	39,3	19,3	5,9	1,5				
Fluoroquinolones																		
Ciprofloxacin	82	60,7		3,7	18,5	11,1	1,5		1,5	3,0	26,7	26,7	5,9	1,5				
Quinolones																		
Nalidixic acid	71	52,6								3,0	22,2	8,1	3,7	10,4	37,8	13,3	1,5	
Aminoglycosides																		
Gentamicin	1	0,7					36,3	55,6	7,4					0,7				
Neomycin	2	1,5							85,2	12,6		0,7	0,7		0,7			
Streptomycin	32	23,7							57,8	15,6	3,0		2,2	5,9	9,6	5,9		
Macrolides																		
Erythromycin	13	9,6					40,7	25,9	12,6	9,6	1,5				9,6			
Polymyxin																		
Colistin	1	0,7						33,3	43,7	12,6	8,1	0,7	0,7			0,7		
Trimethoprim + Sulfonamide																		
Trimethoprim/Sulfamethoxazol (1:19)	22	16,3				1,5	2,2	9,6	26,7	28,1	15,6	2,2	2,2	11,9				

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 0.2 cases per 100,000 inhabitants in the years 1996 to 2003. In 2004 a total of 19 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 21% (4 out of 19) in 2004. 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 2004 (Würzner R, Heller I, Grif, K 2005. Taetigkeitsbericht für das Jahr 2004. Mitteilungen der Sanitaetsverwaltung 4/2005: in press)

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

See 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 harbor listeria in 5 - 10% and ready to eat smoked fish in 6%. Even ready to eat dairy products showed 1% listeria contamination. All three groups included specimens yielding more than 100 CFU/g!

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. Listeriosis in humans

A. Listeriosis in humans

Reporting system in place for the human cases

A monthly report is sent to the Ministry of Health by the National Reference Laboratory, whereas outbreaks are reported immediately.

Case definition

A clinically compatible case that is laboratory confirmed after isolation of *L. monocytogenes* from a normally sterile site or vaginal swabs.

Diagnostic/analytical methods used

Serology: Examination of patient's sera for agglutination antibodies (Listeria Gruber-Widal Reaction, Dade Behring)

Bacteriology: Smears of the samples are Gram stained. Specimen from normally sterile sites are inoculated in blood culture broth or thioglycollate broth and Columbia blood agar plates, vaginal swabs are plated only directly on Columbia blood and colistin-nalidixic acid (CNA) agar. *L. monocytogenes* is identified by catalase and Api Coryne test.

All isolates obtained in Austria are sent to the National Reference Laboratory for confirmation, subtyping and comparison.

Notification system in place

Medical doctors specialised in Laboratory Diagnosis or Microbiology and Hygiene and the attended physicians are subjected to notification. Infections, fatal cases and suspected cases of listeriosis have to be notified according to the National Regulation 254/2004 (BGBl. II, 254/2004, Anzeigepflichtige übertragbare Krankheiten 2004).

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 0.2 cases per 100,000 inhabitants in the years 1996 to 2003. In 2004 a total of 19 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 21% (4 out of 19) in 2004. 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 2004 (Würzner R, Heller I, Grif, K 2005. Taetigkeitsbericht für das Jahr 2004. Mitteilungen der Sanitaetsverwaltung 4/2005: in press)

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

See History of the disease

Relevance as zoonotic disease

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.

Additional information

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

Table 7.2.A Listeriosis in man - species/serotype distribution

	Cases	Incidence per 100.000
Listeriosis	19	0,23
Congenital cases	0	
Deaths	4	0,05

Table 7.2.B Listeriosis in man - age distribution

	Listeriosis			*L. monocytogenes*		
Age group	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year						
1 to 4 years						
5 to 14 years						
15 to 24 years						
25 to 44 years						
45 to 64 years	10	4	6	10	4	6
65 years and older	9	7	2	9	7	2
Age unknown						
All age groups	19	11	8	19	11	8

2.3.3. Listeria in foodstuffs

A. Listeria spp. in food - all foodstuffs - official food or feed controls

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 AV 31.912/16-IV/B/10/03 of 22.12.2003).

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

At the production plant

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

At retail

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

Table 7.1 Listeria monocytogenes in food

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Definition used	Units tested	*Listeria monocytogenes presence in 25 g*	< 100 cfu/g	>100 cfug
Ready to eat meat and meat products									
products from beef at processing plant									
environmental samples at processing plants for beef products						13	0	0	0
products from beef at retail level (incl. Processing plant)			sample	25 g		25	1	0	1
products from pig meat at processing plant									
environmental samples at processing plants for pig meat products						664	21	20	1
products from pig at retail level (incl. Processing plant)			sample	25 g		317	29	29	0
products from poultry at processing plant									
environmental samples at processing plants for poultry products						47	0	0	0
products from poutry at retail level (incl. Processing plant)			sample	25 g		66	3	3	0
other meat products at processing plant									
environmental samples at processing plants for other meat products									
other meat products at retail level (incl. Processing plant)			sample	25 g		119	5	5	0
Ready to eat dairy products									
Cheeses at retail level (incl. Processing plant)	*		sample	1 g		653	11	8	3
Cheeses at retail level (incl. Processing plant)			sample	25 g		1.666	16	12	4
Other dairy products at retail (incl. Processing plant)			sample	1g		816	3	3	0
environmental samples at dairy plants						27	1	1	0
Raw milk for direct human consumption						66	3	3	0
Ready to eat fishery products									
Smoked fish at processing plant									
environmental samples at processing plants for smoked fish									
smoked fish at retail level (incl. Processing plant)			sample	25g		382	35	32	3
other fishery products at processing plant									
environmental samples at processing plants for other fishery products						16	0	0	0
other fishery products at retail level			sample	25g		772	25	24	1
Other ready-to eat products			sample	25g		360	8	8	0

Source of information: Food Safety Department of the City of Vienna, Institute for Food Investigation of the State Vorarlberg and Official Food Control Laboratories, AGES

2.4. VEROCYTOTOXIC ESCHERICHIA COLI

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 2004 438 samples were tested by phenotypic, genotypic and molecular-epidemiological methods at the Austrian Reference Laboratory for EHEC. In total, 57 culture-confirmed EHEC or STEC (shigatoxin producing *E. coli* without eae-gene) were diagnosed.

The number of human EHEC non-O157 (21 isolates) showed an increase compared to the year 2003. In contrast the number of O157 (15 isolates and 7 serologic cases) decreased. This development has already been observed in neighbouring Germany in the last years. Among the 43 diagnosed EHEC cases of the year 2004, 10 patients developed a haemolytic-uraemic syndrome (HUS). Nine of the 10 HUS cases were caused by EHEC O157, in one HUS case O26 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 1999-2004.

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

See History of the disease

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

About 2.4% of Austrian cattle harbor VTEC, and 1% of sheep. We suppose that half of the human VTEC infections are food borne. Consumption of raw milk and contact to minced meat are considered to be the major sources. Approx. 1.5% of minced meat tested positive for VTEC. HUS is a rare disease, but EHECs themselves are not rare, which means that a systemic disease develops only under certain particular predispositions, most of which are currently unknown. Although uncooked meat and unpasteurised dairy products are likely candidates to contract the bacterium, the source of an infection often remains unclear.

The data of two outbreaks in Austria involving environmental transmission or animal contact have been published as abstracts and will be published as full papers (Grif et al., 2005, Eur J Clin Microbiol Infect Dis, in press & Orth et al., 2005, submitted).

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: 39.514/85-IV/B/8/04 (Zoonosenüberwachungsprogramme gemäß RL 2003/99/EG; Durchführung von einheitlichen Überwachungsprogrammen zu ausgewählten Zoonosen sowie diesbezüglicher Antibiotikaresistenzen). The sampling was carried out from 14 May to 26 November 2004 and follow up programs will be realized in the following 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.

2.4.2. Verocytotoxic *Escherichia coli* in humans

A. Verotoxigenic *Escherichia coli* infections in humans

Reporting system in place for the human cases

A monthly report is sent to the Ministry of Health by the National Reference Laboratory, whereas outbreaks are reported immediately.

Case definition

Clinical description: Clinical picture compatible with EHEC infection, e.g. diarrhoea (often bloody) and abdominal cramps. Illness may be complicated by haemolytic uraemic syndrome (HUS) or thrombotic thrombocytopenic purpura (TTP).

Laboratory criteria for diagnosis: Detection of genes coding for Stx1/Stx2 production.

For probable cases: Isolation of *E. coli* belonging to a serogroup known to cause enterohaemorrhagic disease.

Serological confirmation in patients with HUS or TTP (only in selected cases).

Diagnostic/analytical methods used

1. Detection of *E. coli* O157 (most prominent serotype in HUS cases):

- Bacteriology: Isolation of O157 colonies on Fluorocult *E. coli* O157:H7 medium after incubation for 18 hours at 35°C. O157 is confirmed via the *E. coli* O157 Latex Test.
- Serology: This method is constantly used at the German HUS-"Konsiliarlabor"; anti-O157 antibodies of IgG and IgM types can be distinguished.

2. Detection of Verotoxin (VTEC)-producing strains (used at the National Reference Laboratory for EHEC/VTEC/STEC in Innsbruck):

Stools are enriched overnight in a medium containing mitomycin C (EHEC Direct Medium, Heipha, Heidelberg, Germany). Enriched cultures are investigated for presence of shigatoxins by commercial EIA (PremierTM EHEC EIA). Isolate identification is further confirmed by conventional biochemical tests (API 20 E, bioMerieux, Marcy-l´Etoile, France). Enrichments are plated on Sorbitol MacConkey agar and incubated for 24 hours at 37°C. Detection of stx1 and stx2 genes and of the genes encoding EHEC hemolysin (hlyA) and intimin (eae) is done by PCR (Gerber et al. (2002) J Infect Dis 186:493-500).

All EHEC/STEC/VTEC isolates obtained in Austria are sent to the National Reference Laboratory for confirmation, subtyping and comparison. All shigatoxin producing *E. coli* are serotyped with *E. coli* antisera (*E. coli* antisera, Statens Serum Institut, Copenhagen,

Denmark). Comparison of the isolates is done by Pulsed-Field-Gel-Electrophoresis and Ribotyping.

Notification system in place

Medical doctors specialised in Laboratory Diagnosis or Microbiology and Hygiene and the attended physicians are subjected to notification. Notification of bacteriological food-borne illness according to the epidemic act has been mandatory since 1950 (BGBl. 1950/186 Epidemiegesetz, as amended).

History of the disease and/or infection in the country

In 2004 438 samples were tested by phenotypic (ELISA, susceptibility testing, biochemical tests, O- and H- serotyping, motility), genotypic (PCR) and molecular-epidemiological methods (PFGE, Ribotyping) at the Austrian Reference Laboratory for EHEC. In total, 57 culture-confirmed EHEC or STEC (shigatoxin producing *E. coli* without eae-gene) from 48 human, 7 veterinary and 2 foodstuff samples and 7 serologic cases were diagnosed.

The number of human EHEC non-O157 (21 isolates) showed an increase compared to the year 2003. In contrast the number of O157 (15 isolates and 7 serologic cases) decreased. This development has already been observed in neighbouring Germany in the last years.

Among the 43 diagnosed EHEC cases of the year 2004, 10 patients developed a haemolytic-uraemic syndrome (HUS). Nine of the 10 HUS cases were caused by EHEC O157, in one HUS case O26 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 1999-2004.

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

See History of the disease

Relevance as zoonotic disease

HUS is a rare disease, but EHECs themselves are not rare, which means that a systemic disease develops only under certain particular predispositions, most of which are currently unknown. Although uncooked meat and unpasteurised dairy products are likely candidates to contract the bacterium, the source of an infection often remains unclear.

The data of two outbreaks in Austria involving environmental transmission or animal contact have been published as abstracts and will be published as full papers (Grif et al., 2005, Eur J Clin Microbiol Infect Dis, in press & Orth et al., 2005, submitted).

Additional information

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

Table 11.3.A Verocytotoxic *Escherichia coli* infections in man - species/serotype distribution

	Cases	Incidence per 100.000	Imported cases	Incidence per 100.000
HUS				
- clinical cases	10	0,12	2	
- lab. confirmed cases	10	0,12		
- caused by O157 (VT+)	9	0,11		
- caused by other VTEC	1	0,01		
***E.coli* infect. (except HUS)**				
- clincial cases	45	0,55	1	
- laboratory confirmed	45	0,55		
- caused by O157 (VT+)	13	0,16		
- caused by other VTEC	32	0,39		

Table 11.3.B Verocytotoxic *Escherichia coli* infections in man - age distribution

	HUS			*E.coli* infections (except HUS) O157			*E.coli* infections (except HUS) non-O157		
Age group	**All**	**M**	**F**	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year				1	1		3	2	1
1 to 4 years	4	3	1	5	2	3	21	14	7
5 to 14 years	2	1	1	0			2	2	
15 to 24 years	1	1		1		1	0		
25 to 44 years	1	1		2	1	1	3	2	1
45 to 64 years	1	1		4	3	1	2	1	1
65 years and older	1	1		0			1		1
Age unknown				0			0		
All age groups	10	8	2	13	7	6	32	21	11

2.4.3. Pathogenic *Escherichia coli* in foodstuffs

A. Verotoxigenic *E. coli* (VTEC) in food - all foodstuffs - official food or feed controls

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 AV 31.912/16-IV/B/10/03 of 22.12.2003).

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.

Table 11.2 Verocytotoxic *Escherchia coli* in food

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	VT *E.coli* detected	VT *E.coli* O 157	VT *E.coli* O 157:H7	VT *E.coli* Other serotypes
Raw meat									
Beef and veal - Raw meat									
at slaughterhouse									
at processing plant									
at retail level (incl. Processing plant)			sample	25g	22	0			
Pork - Raw meat									
at slaughterhouse									
at processing plant									
at retail level (incl. Processing plant)			sample	25g	1	0			
Poultry - Raw meat									
at slaughterhouse									
at processing plant									
at retail level (incl. Processing plant)									
Sheep - Raw meat									
at slaughterhouse									
at processing plant									
at retail level (incl. Processing plant)									
Goat - Raw meat									
at slaughterhouse									
at processing plant									
at retail level (incl. Processing plant)									
Meat products									
Beef and veal - meat products									
at slaughterhouse									
at processing plant									
at retail level (incl. Processing plant)									
Pork - meat products									
at slaughterhouse									
at processing plant									
at retail level (incl. Processing plant)			sample	25g	3	0			
Poultry - meat products									
at slaughterhouse									
at processing plant									
at retail level (incl. Processing plant)									
minced meat **(mixed meat)**			sample	25g	131	2			2
Prepared meat meals									
Milk from cow, raw			sample	25g	37	0			
Drink. milk, heat treated			sample	25g	1	0			
Milk-based products			sample	1-25g	77	0			
Fishery products									
Others			sample	1-25g	56	0			

Source of information: Food Safety Department of the City of Vienna, Institute for Food Investigation of the State Vorarlberg and Official Food Control Laboratories, AGES

2.4.4. Pathogenic *Escherichia coli* in animals

A. Verotoxigenic *Escherichia coli* in cattle (bovine animals)

Monitoring system

Sampling strategy

Monitoring program of the prevalence of VTEC in slaughtered animals: At an estimated prevalence for VTEC of 20% by 95% confidence and 5% type one error, 305 slaughtered bovine animals had to be tested, calculated on approximately 600.000 slaughtered bovine animals in 2002 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 75 abattoirs in which more than 500 bovine animals were slaughtered in 2002 accounted for more than 95% of the total annual bovine production. Sampling was performed in the 43 of the 75 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 32 samplings were distributed over the 43 abattoirs.

Frequency of the sampling

Animals at slaughter: Detection of annual prevalence of 20 % by 95% confidence and 5% type one error.

Type of specimen taken

Animals at slaughter: Colon containing 50 to 100 grams of feces.

Methods of sampling (description of sampling techniques)

Animals at slaughter

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: 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: At first approximately 1g content of the colon wenas 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.

Vaccination policy

No vaccination

Other preventive measures than vaccination in place

No measures

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 of the prevalence of VTEC in slaughtered animals: At an estimated prevalence for VTEC of 30% by 95% confidence and 10% type one error, 101 slaughtered sheep and goats had to be tested, calculated on approximately 88.000 slaughtered sheep and goats in 2002 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 bovine animals were slaughtered in 2002 accounted for more than 92% of the total annual sheep and goat production. Sampling was performed in the 17 abattoirs.

Frequency of the sampling

Animals at slaughter: Detection of annual prevalence of 30 % by 95% confidence and 10% type one error.

Type of specimen taken

Animals at slaughter: Colon containing 50 to 100 grams of feces.

Methods of sampling (description of sampling techniques)

Animals at slaughter: 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 plastik 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: 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: 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).

Vaccination policy

No vaccination

Other preventive measures than vaccination in place

No measures

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 11.1 Verocytotoxic Escherchia coli in animals

Animal species	Source of information	Remarks	Epidemiological unit	Units tested	units positive for VT *E.coli*	VT *E.coli* O 157	VT *E.coli* O 157:H7	VT *E.coli* Other serotypes
Cattle								
not specified			A	287	7			7
Sheep and Goats			A	89	1			1

A= animals at slaughter
Source of information: Institute for Veterinary Disease Control Linz, AGES

2.5. TUBERCULOSIS

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. *Mycobacterium bovis* accounts for less than 3 percent of human disease (incidence of human tuberculosis: 7.92/100.000 in 2004).

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 nearly completely free of bovine tuberculosis: no single case was detected in 2004.

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

Absence of positive findings in 2004

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. Tuberculosis in humans

A. Tuberculosis due to *Mycobacterium bovis* in humans

Case definition

Definite: A case with isolation of *M. tuberculosis* complex (except *M. bovis* BCG) from any clinical specimen.

Other than definite: A case that meats the clinical criteria above but does not meet the laboratory criteria of a definite case

Diagnostic/analytical methods used

- Definite: Staining: Ziehl-Neelsen, Auramin-Rhodamin stains are performed on histological preparation and smears of the sample material
- Culture: After decontamination of the homogenised sample material in NALC-NaOH and centrifugation, the sample material is transferred in parallel on Loewenstein-Jensen agar containing glycerol and PACT and Stonebrink agar containing PACT and MGIT-medium. The media are incubated at 37 °C up to 8 weeks.

  Confirmation of the species by Amplicor (Roche)
- Other than definite: A skin test and an X-Ray of the thorax are performed.

Notification system in place

The person who diagnoses (laboratory/ hospital/ general practitioner) has to notify definite (only *M. tuberculosis*, not *M. bovis* [until 2004]) and other than definite cases (this excludes radiologists) to the local health authority (Federal Law BGBl. 127/1968: Tuberkulosegesetz, as amended; National Regulation BGBl. Nr. 254/2004: Anzeigepflichtige übertragbare Krankheiten 2004). *M. bovis* is notifyable since 2004 (National Regulation BGBl. Nr. 254/2004: Anzeigepflichtige übertragbare Krankheiten 2004).

History of the disease and/or infection in the country

The National Reference Laboratory for Tuberculosis (NRL-T) is nominated since 1995. Since 1998 all data are compiled in a national Database.

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

The 4 human cases (1 *M. bovis* case, 3 *M. caprae* cases) are under investigation.

Relevance as zoonotic disease

The relevance is inconsiderable; in average only four of 645 human tuberculosis cases are caused by *M. bovis/M caprae*.

Table 1.2.A Tuberculosis in man - species/serotype distribution

	Cases	Incidence per 100.000
Tuberculosis	649	7,97
M. bovis	1	0,01
M. tuberculosis definitive lt. WHO	645	7,92
M. caprae	3	0,04
Reactivation of previous cases		

Table 1.2.B Tuberculosis in man - age distribution

	M. bovis			*M. tuberculosis* **			*M. caprae*		
Age group	**All**	**M**	**F**	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year				2	0	2			
1 to 4 years				4	3	1			
5 to 14 years				9	7	2			
15 to 24 years	1	1		91	59	32			
25 to 44 years				226	151	75			
45 to 64 years				162	131	31	1	1	
65 years and older				155	83	72	2		2
Age unknown									
All age groups	1	1	0	649	434	215	3	1	2

** M.tuberculosis definitive lt. WHO

2.5.3. 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

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 an 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: 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 2004 in Austria.

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

No cases in 2004 in Austria.

Additional information

Nil

C. *Mycobacterium* spp. in animal - all animals - at slaughter – Control programme - mandatory - official sampling (all slaughtered animals except those mentioned above)

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

Type of specimen taken

Other: Macroscopically tuberculous alterations and lymphnodes

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 2004 in Austria.

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

No cases in 2004 in Austria.

Additional information

Nil

Table 1.1.3 Tuberculosis in animals

Animal species	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	*M. bovis*	*M. caprae*	*M. tuberculosis*
Sheep	*)		animals	298.493	0			
Goats	*)		animals	44.681	0			
Pigs	*)		animals	5.397.670	0			

Number of animals examined according to the ante-mortem and post-mortem inspection act
*) Central Veterinary Services and National Reference Laboratory for Tuberculosis in Animals

Table 1.1.1 Bovine tuberculosis

MANDATORY	**CATTLE**		
Number of herds under official control:	86.034	Number of animals under official control:	2.050.991
	OTF bovine herds	OTF bovine herds with status suspended	Bovine herds infected with tuberculosis
Status of herds at year end:	86.034	0	0
New cases notified during the year:		0	0
	Units tested	Units suspected	Units positive
Routine tuberculin test - data concerning herds:	not available	not available	not available
Routine tuberculin test - data concerning animals:	898	0	0
	Animals slaughtered	Animals suspected	Animals positive
Routine post-mortem examination:	674.070	0	0
		Herds suspected	Herds confirmed
Follow up of suspected cases in post-mortem		0	0
Follow-up investigation of suspected cases:		0	0
	Animals tested	Animals suspected	Animals positive
Other routine investigations: exports:	461	0	0
Other routine investigations: tests at AI stations:	483	0	0
	All animals	Positives	Contacts
Animals destroyed:	0	0	0
Animals slaughtered:	0	0	0
VOLUNTARY	**CATTLE**		
	Animals tested	Animals suspected	Animals positive
Other investigations: imports:	413	0	0
	Herds tested	Herds suspected	Herds positive
Other investigations: farms at risk:	0	0	0
	Samples tested	*M. bovis* isolated	
Bacteriological examination:	0	0	

Source of information: Central Veterinary Services, Provincial Veterinary Services and National Reference Laboratory for Tuberculosis in animals

Table 1.1.2 Tuberculosis in farmed deer

MANDATORY	**FARMED DEER**		
Number of herds under official control:	not available	Number of animals under official control:	not available
	"OTF" herds	"OTF" herds with status suspended	Herds infected with tuberculosis
Status of herds at year end:	not available	0	0
New cases notified during the year:	0	0	0
	Units tested	Units suspected	Units positive
Routine tuberculin test - data concerning herds:	not available	0	0
Routine tuberculin test - data concerning animals:	not available	0	0
	Animals slaughtered	Animals suspected	Animals positive
Routine post-mortem examination:	not available	0	0
		Herds suspected	Herds confirmed
Follow up of suspected cases in post-mortem examination:		0	0
Follow-up investigation of suspected cases: trace, contacts:		0	0
	Herds tested	Herds suspected	Herds positive
Other routine investigations: exports:	not available	0	0
Other routine investigations: tests at AI stations:			
	All animals	Positives	Contacts
Animals destroyed:	0	0	0
Animals slaughtered:	0	0	0
VOLUNTARY	**FARMED DEER**		
	Animals tested	Animals suspected	Animals positive
Other investigations: imports:	not available	0	0
	Herds tested	Herds suspected	Herds positive
Other investigations: farms at risk:	0	0	0
	Samples tested	*M. bovis* isolated	
Bacteriological examination:	0	0	

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. In the animal population, only *B. suis* was found in 2004. This affected only one single holding of pigs.

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

All human cases occurring in Austria in 2004 (n = 2) were probably acquired abroad. The source of the single outbreak in pigs is unclear, but probably due to contact of a boar to a wild hare.

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

This single occurrence of *B. suis* in pigs in Austria, which became obvious due to abortions in pigs, underlines the importance of continued vigilance.

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. Brucellosis in humans

A. Brucellosis in humans

Reporting system in place for the human cases

Nil

Case definition

Clinical description: Clinical picture compatible with brucellosis, e.g. acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache and arthralgia.

Laboratory criteria for diagnosis

- Demonstration of a specific antibody response
- Isolation of Brucella sp. from a clinical specimen

Diagnostic/analytical methods used

- Serological examination: Serum samples are tested in 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.
- Bacteriological: Several blood samples are inoculated in blood culture broth in consecutive days. The incubation lasted 4 to 6 weeks, once per week medium is transferred on brucella agar and incubated 5-10% CO2 atmosphere (Anonymus: Standardisierung und Qualitätssicherung in der mikrobiologischen Diagnostik. Richtlinien. Bundesministerium für Soziale Sicherheit und Generationen. ISBN 3-84123-126-0, Wien, 2001, pg. 56).
- The genus is identified by microscopic examination, catalase-, oxidase- and the slide agglutination test using brucella serum. The species is identified by CO2 requirement, H_2S 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.)

Notification system in place

Medical doctors specialised in Laboratory Diagnosis or Microbiology and Hygiene and the attended physicians are subjected to notification. Notification of brucellosis according to the epidemic act has been mandatory since 1950 (BGBl. 1950/186 Epidemiegesetz, as amended).

History of the disease and/or infection in the country

Austria is OBF and OBmF. All cases are epidemiologically linked to holidays in endemic countries or foreign workers from endemic countries.

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

This Zoonosis has no relevance in Austria

Relevance as zoonotic disease

Nil

Additional information

Nil

Table 2.3.A Brucellosis in man - species/serotype distribution

	Cases	Incidence per 100.000	Imported cases	Incidence per 100.000
Brucellosis	2	0,02		
B. abortus				
B. melitensis	1	0,01	1	0,01
B. suis				

Table 2.3.B Brucellosis in man - age distribution

	Brucellosis			*B. abortus*			*B. melitensis*		
Age group	**All**	**M**	**F**	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year									
1 to 4 years									
5 to 14 years									
15 to 24 years	1	1							
25 to 44 years	1	1					1	1	
45 to 64 years									
65 years and older									
Age unknown									
All age groups	2	2	0	0	0	0	1	1	0

2.6.3. Brucella in foodstuffs

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

2.6.4. 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

- Periodical monitoring scheme: Blood samples
- Abortion or premature birth: Abortive material and blood samples from the animal that had an abort.

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 test result of the Complement Fixation Test 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 I-ELISA 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

No positive cases in 2004

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

- Monitoring: Blood samples.
- Clinical cases: Abortion material and blood samples from the animal that had an abort.

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) were tested in the Indirect or Competitve 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

No positive cases in 2004

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

- Monitoring: Blood samples.
- Clinical cases: Abortion material and blood samples from the animal that had an abort.

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 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 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

No positive cases in 2004

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. *Brucella suis* in animal - Pigs

Monitoring system

Sampling strategy

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

In one holding brucella was detected in animals that had an abort. In contact holdings and holdings from which the pigs were descending, pigs were serologically tested.

Frequency of the sampling

Targeted, following abortion and in positive cases contact holdings.

Type of specimen taken

- Monitoring: Blood samples;
- Clinical cases: Abortion material and blood samples from the animal that had an abort

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 cros 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

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

In 2004 *B. suis* was found in one holding following an increase of abortions. The reactors were killed, the other pigs were slaughtered. The source of infection could not be found.

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

Nil

Additional information

Nil

Table 2.1.1 Bovine brucellosis

MANDATORY	**CATTLE**		
Number of herds under official control:	86034	Number of animals under official control:	2050991
	OBF bovine herds	OBF bovine herds with status suspended	Bovine herds infected with brucellosis
Status of herds at year end:	86034	not available	0
New cases notified during the year:	0	0	0
	Animals tested	Animals suspected	Animals positive
Notification of clinical cases, including abortions:	602	0	0
	Units tested	Units suspected	Units positive
Routine testing - data concerning herds:	17015	not available	0
Routine testing - number of animals tested:	196321	37	0
Routine testing - number of animals tested individually:	na	not available	not available
		Herds suspected	Herds confirmed
Follow-up investigation of suspected cases: trace, contacts:		0	0
	Animals tested	Animals suspected	Animals positive
Other routine investigations: exports:	2809	0	0
Other routine investigations: tests at AI stations:	551	0	0
	All animals	Positives	Contacts
Animals destroyed:	0	0	0
Animals slaughtered:	0	0	0
VOLUNTARY	**CATTLE**		
	Animals tested	Animals suspected	Animals positive
Other investigations: imports:	791	0	0
	Herds tested	Herds suspected	Herds positive
Other investigations: farms at risk:	0	0	0
	Samples tested	Brucella isolated	
Bacteriological examination:	not available	0	

Source of information: Central Veterinary Services, Provincial Veterinary Services and National Reference Laboratory for Brucellosis

Table 2.1.2 Ovine and caprine brucellosis

MANDATORY	SHEEP		
Number of holdings under official control:	27809	Number of animals under official control:	395227
	OBF ovine holdings	OBF ovine holdings with status suspended	Ovine holdings infected with brucellosis
Status of herds at year end (a):	27809	0	0
New cases notified during the year (b):	0	0	0
	Animals tested	Animals suspected	Animals positive
Notification of clinical cases, including abortions (c):	not available	not available	not available
	Units tested	Units suspected	Units positive
Routine testing (d) - data concerning holdings:	1625	10	0
Routine testing (d) - data concerning animals:	11752	10	0
		Holdings suspected	Holdings confirmed
Follow-up investigation of suspected cases: trace, contacts (e):		0	0
	Animals tested	Animals suspected	Animals positive
Other routine investigations: exports (f):	not available	0	0
	All animals	Positives	Contacts
Animals destroyed (g):	0	0	0
Animals slaughtered (h):	0	0	0
VOLUNTARY	**SHEEP**		
	Animals tested	Animals suspected	Animals positive
Other investigations: imports (i):	not available	0	0
	Holdings tested	Holdings suspected	Holdings positive
Other investigations: holdings at risk (j):	0	0	0
	Samples tested	Brucella isolated	
Bacteriological examination (k):	not available	0	

Source of information: Central Veterinary Services, Provincial Veterinary Services and National Reference Laboratory for Brucellosis

Table 2.1.3 Brucellosis in animals

Animal species		Source of information	Remarks	Epidemiological unit	Units tested	Units positive	*B. melitensis*	*B. abortus*	*B. suis*
Pigs	serological		Abort	Animal	81	19			
Pigs	bacteriological		Abort	Animal	not available	1			1
Pigs	serological		TGD	Animal	1.028	0			

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

A. *Yersinia entercolitica* 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 campyloacerosis.

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

In 2004 a total of approx. 100 human infections were reported. 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 23 food samples tested negative for *Yersinia* in 2004.

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. Yersiniosis in humans

A. Yersinosis in humans

Case definition

Clinical description: An illness of variable severity characterised by diarrhoea, fever, nausea, cramps and tenesmus.

Laboratory criteria for diagnosis: Isolation of *Yersinia enterocolitica* Serogroup O3, O9 or O5 or Y. pseudotuberculosis from a clinical specimen.

Diagnostic/analytical methods used

Fecal (*Yersinia enterocolitica*) or resection (Y. pseudotuberculosis) sample material is plated directly on cefsulodin-irgasan-novobiocin (CIN) agar and incubated for 18 hours at 30°C. Suspicious colonies are identified in an Api 20 E reaction; Y. enterocolitica is agglutinated with sera against serogroups O3, O5 and O9.

Notification system in place

Medical doctors specialised in Laboratory Diagnosis or Microbiology and Hygiene and the attended physicians are subjected to notification. Notification of salmonellosis according to the epidemic act has been mandatory since 1950 (BGBl. 1950/186 Epidemiegesetz, as amended).

History of the disease and/or infection in the country

Nil

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

Nil

Relevance as zoonotic disease

Nil

Table 8.3.A Yersiniosis in man - species/serotype distribution

	Cases	Incidence per 100.000
Yersiniosis	110	1,35
Y. enterocolitica O:3	70	0,86
Y. enterocolitica O:9	8	0,10
Y. pseudotuberculosis	1	0,01

Table 8.3.B Yersiniosis in man - age distribution

	Yersiniosis			*Y. enterocolitica*			*Y. pseudotuberculosis*		
Age group	**All**	**M**	**F**	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year	2	1	1	2	1	1			
1 to 4 years	17	11	6	17	11	6			
5 to 14 years	20	16	4	20	16	4			
15 to 24 years	12	4	8	12	4	8			
25 to 44 years	14	7	7	13	6	7	1	1	
45 to 64 years	8	4	4	8	4	4			
65 years and older	6	4	2	6	4	2			
Age unknown	31								
All age groups	**110**	**47**	**32**	**78**	**46**	**32**	**1**	**1**	

Table 8.3.C Yersiniosis in man - seasonal distribution

	Yersiniosis	*Y. enterocolitica*	*Y. pseudotuberc.*
Month	Cases	Cases	Cases
January	6	6	
February	5	5	
March	2	2	
April	4	4	
May	4	4	
June	5	5	
July	7	7	
August	6	5	1
September	8	8	
October	10	10	
November	8	8	
December	14	14	
not known	31		
Total	**110**	**78**	**1**

2.7.3. Yersinia in foodstuffs

A. *Yersinia enterocolitica* in food - all foodstuffs - official food or feed controls

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 AV 31.912/16-IV/B/10/03 of 22.12.2003).

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 enterocolitic*a is performed according to ISO 10273:1994

Table 8.2 *Yersinia enterocolitica* in food

Categories	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	*units positive for Yersinia enterocolitica*	*Yersinia enterocolitica* O:3	*Yersinia enterocolitica* O:9
Raw meat								
Beef and veal - Raw meat								
at slaughterhouse								
at processing plant								
at retail level (incl. Processing plant)								
Pork - Raw meat								
at slaughterhouse								
at processing plant								
at retail level (incl. Processing plant)			sample	25g	1	0		
Poultry - Raw meat								
at slaughterhouse								
at processing plant								
at retail level (incl. Processing plant)			sample	25g	2	0		
Other - Raw meat								
at slaughterhouse								
at processing plant								
at retail level (incl. Processing plant)								
Meat products								
Beef and veal - meat products								
at slaughterhouse								
at processing plant								
at retail level (incl. Processing plant)								
Pork - meat products								
at slaughterhouse								
at processing plant								
at retail level (incl. Processing plant)			sample	25g	5	0		
Poultry - meat products								
at slaughterhouse								
at processing plant								
at retail level (incl. Processing plant)			sample	25g	1	0		
Other - meat products								
at slaughterhouse								
at processing plant								
at retail level (incl. Processing plant)			sample	25g	2	0		
Prepared meat meals								
Milk, raw								
Milk-based products					4	0		
Fishery products								
Others					8	0		

Source of information: Food Safety Department of the City of Vienna, Institute for Food Investigation of the State Vorarlberg and Official Food Control Laboratories, AGES

2.7.4. Yersinia in animals

There are no valid data about animals concerning *Yersinia* available in Austria!

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 2004.

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

No documented human infections in 2004.

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

No documented infections in food-animals in 2004.

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. Trichinellosis in humans

A. Trichinellosis in humans

Case definition

Clinical description: A disease caused by ingestion of Trichinella larvae. The disease has variable clinical manifestations. Common signs and symptoms among symptomatic persons include eosinophilia, fever, myalgia, and periorbital edema. Laboratory criteria for diagnosis: Demonstration of Trichinella larvae in tissue obtained by muscle biopsy, or Positive serologic test for Trichinella

Diagnostic/analytical methods used

ELISA and Westernblot

Notification system in place

Notification of trichionellosis according to the epidemic act since 1950 (BGBl. 1950/186 Epidemiegesetz, as amended).

History of the disease and/or infection in the country

The last autochthonous cases have been reported in 1970

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

Nil

Relevance as zoonotic disease

No relevance in Austria

Table 4.2.A Trichinellosis in man - species/serotype distribution

	Cases	Incidence per 100.000
Trichinellosis	0	0

2.8.3. Trichinella in animals

A. *Trichinella* spp. in pigs

Monitoring system

Sampling strategy

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

Other: Permanent post-mortem sampling of each slaughtered pig

Type of specimen taken

Other: Muscles: Diaphragm (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: 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 4 hours, filtration and investigation with a stereo- or trichinoscope.

Vaccination policy

Nil

Other preventive measures than vaccination in place

Nil

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

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* spp. 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 4 hours, filtration and investigation with a stereo- or trichinoscope.

Vaccination policy

Nil

Other preventive measures than vaccination in place

Nil

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

No findings in horses.

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. in animal - Wildlife - 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 4 hours, filtrtation and investigation with a stereo- or trichinoscope.

Vaccination policy

Nil

Other preventive measures than vaccination in place

Nil

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

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 4.1 *Trichinella* spp. in animals

Animal species	Source of information	Remarks	Epidemiological unit	Animals tested	Animals positive
Pigs			animal	5.397.670	0
Solipeds			animal	1.033	0
Wild boars			animal	31.947	0
Other Wildlife			animal	178.125	0

Source of information: Central Veterinary Services, Provincial Veterinary Services and 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 2004 there were even 4 patients.

The large majority of echinococcisis affects patients who acquired the cystic infection during childhood in countries like former Jugoslawia or Turkey (in 2004: 21 patients).

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. Echinococcosis in humans

A. *Echinococcus* spp. in humans

Case definition

Clinical apparent case (differentiation between alveolar and cystic echinococcosis necessary) with laboratory diagnostic confirmation: = histopathology or combination of imaging (ultrasound, X-ray, computed tomography or others) and positive serology or combination of specific DNA (by PCR) and positive serology).

Diagnostic/analytical methods used

ELISA and Westernblot technique, participant of the UK National External Quality Assessment Service for Microbiology, National Reference Laboratory for Echinococcosis.

Notification system in place

Echinococcosis is a notifiable disease since June 2004 according to the National Regulation 254/2004 (BGBl. II, 254/2004 of 18 June in 2004, Anzeigepflichtige übertragbare Krankheiten 2004)

History of the disease and/or infection in the country

- Alveolar echinococcosis has been known in Austria since 1897; annual incidence (1897-2004): 0-6 cases, mean incidence: 2, 4 cases/year (only autochthonous cases); geographic distribution in Austria: mainly in the western provinces (Vorarlberg, Tyrol, Salzburg), but cases are known from each province; outbreaks are not known.
- Cystic echinococcosis has been known in Austria at least since 1819; Cases of cystic echinococcosis have been registered in the Clinical Institute of Hygiene and Medical Microbiology (Medical University Vienna) regularly since the beginning of the 1980ies. Annual incidence (1984 - 2004): 20 - 60 cases; mean incidence: 31 cases per year, one third of patients are of Austrian origin; two thirds are from abroad. Geographic distribution in Austria: Unknown; a few autochthonous infections could be observed mainly in the eastern and southern provinces (Lower Austria, Burgenland, Styria); outbreaks are not known.

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

- Alveolar echinococcosis: We expect the prevalence to be low in future; sources of infection: fox feces (contaminated hands and fingers, vegetables, water).
- Cystic echinococcosis: We expect the prevalence to be low in future; sources of infection: dog feces, presumably in a very few foci (in or around farmers houses)

Relevance as zoonotic disease

Low prevalence in both forms of echinococcosis

Table 9.2.A Echinococcosis in man - species/serotype distribution

	Cases	Incidence per 100.000	Autochtone cases	Incidence per 100.000	Imported cases	Incidence per 100.000
Echinococcosis	25	0,31				
Cystic echinococcosis	21	0,26				
Alveolar echinococcosis	4	0,05	4		0	

Table 9.2.B Echinococcosis in man - age distribution

	Echinococcus			*E. granulosus*			*E. multilocularis*		
Age group	**All**	**M**	**F**	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year									
1 to 4 years									
5 to 14 years	3	3	0	3	3	0	0	0	0
15 to 24 years	1	1	0	1	1	0	0	0	0
25 to 44 years	11	5	6	10	5	5	1	0	1
45 to 64 years	5	1	4	5	1	4	0	0	0
65 years and older	5	3	2	2	0	2	3	3	0
Age unknown	0	0	0	0	0	0	0	0	0
All age groups	**25**	**13**	**12**	**21**	**10**	**11**	**4**	**3**	**1**

2.9.3. Echinococcus in animals

A. *Echinococcus* spp. 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

Diagnostic/analytical methods used

Other: All organs and muscles that were used for human consumption were visually inspected, palpated and cuttings were performed

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 2004 no case was detected in the post-mortem inspection. In 8.1% of 86 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

B. *Echinococcus multilocularis* in animals - Wildlife - foxes

Monitoring system

Sampling strategy

On one hand sampling was a survey of a determined area in the province of Lower Austria (district of Gänserndorf) to compare with data of the year before, on the other hand 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.

Type of specimen taken

Other: Small intestine

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

Diagnostic/analytical methods used

Other: The whole content of the small intestine of each sampled fox was examined in the modified sedimentation technique, shaking in a vessel technique. (Duscher, G., Prosl, H., Joachim, A. (2005): Scraping or shaking-A comparison of methods for the quantitative determination of *Echinococcus multilocularis* in fox intestines. Paras. Res. 95, 40-42.).

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

Table 9.1 *Echinococcus* sp. in animals

Animal species	Source of information	Remarks	Epidemiological unit	Units tested	*Echinococcus* detected	*E. multilocularis*	*E. granulosus*
Cattle	a)		animals	674.070	0		
Sheep	a)		animals	298.493	0		
Goats	a)		animals	44.681	0		
Pigs	a)		animals	5.397.670	0		
Solipeds	a)		animals	1.033	0		
Wildlife							
Foxes	b)		animals	86	7	7	0
other	a)		animals	178.125	0		

Source of information:
a) Central Veterinary Services and Provincial Veterinary Services
b) Institute of Parasitology and Zoology, Department for Pathobiology

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

Austria is one of few countries who established routine serological screening programs in pregnant women.

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

No valid data on the incidence of human toxoplasmosis are available for Austria.

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

No valid data are available for Austria. Of animals tested for toxoplasmosis due to abortion approx. 30-50% show antibodies against Toxoplasma gondii

Recent actions taken to control the zoonoses

Nil

Suggestions to the Community for the actions to be taken

Nil

Additional information

Nil

Table 10.2.A Toxoplasmosis in man - species/serotype distribution

	Cases	Incidence
Toxoplasmosis*	29	
pregnant	22	0,16 (per 100 births in Upper Austria)
not pregnant	7	0,5 (per 100.000 persons in Upper Austria)
Congenital cases	0	

* Valid data only available for the province of Upper Austria

Table 10.2.B Toxoplasmosis in man - age distribution

	Toxoplasmosis			NICHT schwanger			schwanger		
Age group	**All**	**M**	**F**	**All**	**M**	**F**	**All**	**M**	**F**
< 1 year	0								
1 to 4 years	0								
5 to 14 years	1		1	1	0	1			
15 to 24 years	10	1	9	3	1	2	7		7
25 to 44 years	18	1	17	3	1	2	15		15
45 to 64 years									
65 years and older									
Age unknown									
All age groups	**29**	**2**	**27**	**7**	**2**	**5**	**22**	**0**	**22**

Valid data only available for the province of Upper Austria

2.10.3. Toxoplasma in animals

Table 10.1 Toxoplasma gondii in animals

Animal species	Source of information	Remarks	Epidemiological unit	Units tested	*units positive*
Cattle		Abort	animal	6	3
Sheep		Abort	animal	18	7
Goats		Abort	animal	16	7
Pigs		Abort	animal	38	10

Source of information:
Institute for Veterinary Disease Control, Moedling, AGES

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 2004 one person died on rabies in Austria, after being bitten by a puppy in Morocco

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

The fatal case in an Austrian was not connected to Austrian animals. 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.

Recent actions taken to control the zoonoses

In 2004 there were still vaccination programs carried out (due to rabies in fox in 2003). The isolation of the rabies-vaccination strain from brain of a dead fox in 2004 does not warrant increased hunting activities in the affected region (for decimation of the fox population and for increased diagnostic surveillance).

Suggestions to the Community for the actions to be taken

Nil

Additional information

Nil

2.11.2. Rabies in humans

A. Rabies in humans

Case definition

- Laboratory criteria for diagnosis
- Detection by direct fluorescent antibody of viral antigens in a clinical specimen (preferably the brain or the nerves surrounding hair follicles in the nape of the neck)
- Detection of rabies nucleic acid in clinical specimen
- Isolation (in cell culture or in a laboratory animal) of rabies virus from saliva, cerebrospinal fluid (CSF), or central nervous system tissue
- Identification of a rabies-neutralising antibody titre (complete neutralization) in the serum or CSF of an unvaccinated person.

Diagnostic/analytical methods used

Liquor, smears from pharynx, swab from conjuntivae biopsy at the nape of the neck and serum were examined in the fluorescent antibody test (FAT), immunohistochemistry and RT-PCR (Ito M., Itou T., Sakai T., et al. (2001). Detection of Rabies Virus RNA isolated from several species of animals in Brazil by RT-PCR. Journal of Veterinary medicine Science 63(12): 1309-1313.).

Notification system in place

Rabies and bite of an infected animal or an animal suspected to be infected according to the epidemic act (BGBl. 1950/186 Epidemiegesetz, as amended).

History of the disease and/or infection in the country

Nil

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

In 2004 one person died after being bitten by a puppy in Morocco.

Relevance as zoonotic disease

Nil

2.11.3. 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.

Type of specimen taken

Other: Brain (stem brain or ammon´s brain)

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

Type of specimen taken

Other: Brain (ammon´s horn and brain stem)

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 5.1 Rabies in animals

Animal species	Source of information	Remarks	Animals tested	Animals positive
Cattle			15	0
Sheep			1	0
Goats			1	0
Solipeds			3	0
Wildlife, all			11.003	1
Bats			2	0
Foxes		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.	9.772	1
Other wildlife			1.229	0
Dogs			78	0
Cats			126	0
Other pets			12	0
Others			4	0

Source of information: Central Veterinary Services and National Reference Laboratory for Rabies

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.0. ENTEROCOCCUS INDICATORS

3.0.1. General evaluation of the national situation

A. Enterococcus General Evaluation

History of the disease and/or infection in the country

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data available for comparison

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

3.0.2. Antimicrobial resistance in Enterococcus isolates

A. Antimicrobial resistance of Enterococcus spp. in animal - Cattle (bovine animals) - at slaughter - monitoring programme - active monitoring

Sampling strategy used in monitoring

Frequency of the sampling

Monitoring program on the occurrence and trend of antimicrobial resistance in enterococci based on the prevalence of enterococci in slaughtered animals: At an estimated prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 385 enterococci isolates from bovine animals were required.

To obtain this number of isolates, as sample size, 770 slaughtered bovine animals had to be tested, calculated on approximately 600.000 slaughtered bovine animals in 2002 in Austria, and an enterococci prevalence of 50% by 95% confidence and 5% type one error.

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 75 abattoirs in which more than 500 bovine animals were slaughtered in 2002 accounted for more than 95% of the total annual bovine production. Sampling was performed in the 43 of the 75 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 32 samplings were distributed over the 43 abattoirs.

Type of specimen taken

Colon containing 50 to 100 grams of feces.

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 plastik 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 enterococci.

Procedures for the selection of isolates for antimicrobial testing

All 147 *Enterococcus faecium* and 84 *E. faecalis* isolates obtained in the monitoring program had been tested.

Laboratory methodology used for identification of the microbial isolates

Enterococcus like colonies were differentiated after isolation on citrate acid tween carbonate (CATC) agar and subculture on Columbia sheep blood agar by microscopic examination of Gram stains and the production of catalase. The differentiation of *E. faecium* and *E. faecalis* was performed by detection of hydrolysis of Pyruvate and Arabinose.

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 (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data available for comparison

Additional information

Nil

B. Antimicrobial resistance of Enterococcus spp. in animal - Pigs – at slaughter - monitoring programme - active monitoring

Sampling strategy used in monitoring

Frequency of the sampling

Monitoring program on the occurrence and trend of antimicrobial resistance in enterococci based on the prevalence of enterococci in slaughtered animals: At an estimated prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 385 enterococci isolates from pigs were required.

To obtain this number of isolates, as sample size 770 slaughtered pigs had to be tested, calculated on approximately 4.300.000 slaughtered pigs in 2002 in Austria, and an enterococci prevalence of 50% by 95% confidence and 5% type one error.

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 77 abattoirs in which more than 3.500 pigs were slaughtered in 2002 accounted for more than 95% of the total annual pig production. Sampling was performed in the 53 of the 77 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 24 samplings were distributed over the 53 abattoirs.

Type of specimen taken

Colon containing 50 to 100 grams of feces.

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 plastik 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 enterococci.

Procedures for the selection of isolates for antimicrobial testing

All isolated and frozen enterococci strains, 147 *Enterococcus faecium* and 84 *E. faecalis* isolates obtained in the monitoring program had been tested.

Laboratory methodology used for identification of the microbial isolates

Enterococcus like colonies were identified after isolation on citrate acid tween carbonate (CAT) agar and subculture on Columbia sheep blood agar by microscopic examination of Gram stains and the production of catalase. The differentiation of *E. faecium* and *E. faecalis* was performed by detection of hydrolysis of Pyruvate and Arabinose.

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 (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data available for comparison

Additional information

Nil

C. Antimicrobial resistance of Enterococcus spp. in animal - Poultry – at slaughter - monitoring programme - active monitoring (slaughter batch)

Sampling strategy used in monitoring

Frequency of the sampling

Monitoring program on the occurrence and trend of antimicrobial resistance in enterococci based on the prevalence of enterococci in slaughter batches: At an estimated prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 203 enterococci isolates from poultry were required.

To obtain this number of isolates, as a primary sample size, 416 slaughter batches of poultry had to be tested, calculated on approximately 8000 slaughter batches of poultry in 2002 in Austria, and an enterococci prevalence of 50% by 95% confidence and 5% type one error.

Caeca of 10 animals as the secondary sample size that gives the number of birds per batch to be sampled had been assessed computed on slaughter batches of more than 2000 broilers.

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. The 8 slaughter plants included in the surveillance program accounted for almost 100% of broilers and turkeys of the total production in Austria.

Sampling was performed in the 8 poultry slaughter plants with slaughter batches consisting of >2000 animals in Austria. The 8 slaughter plants included in the surveillance program accounted for almost 100% of broilers and turkeys of the total production in Austria.

Type of specimen taken

At slaughter: The whole intestines of 10 animals

Methods of sampling (description of sampling techniques)

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 plastik 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 enterococci.

Procedures for the selection of isolates for antimicrobial testing

All 23 *Enterococcus faecium* and 160 *E. faecalis* isolates obtained in the monitoring program had been tested.

Laboratory methodology used for identification of the microbial isolates

Enterococcus like colonies were identified after isolation on citrate acid tween carbonate (CAT) agar and subculture on Columbia sheep blood agar by microscopic examination of Gram stains and the production of catalase. The differentiation of *E. faecium* and *E. faecalis* was performed by detection of hydrolysis of Pyruvate and Arabinose.

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 (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data available for comparison

Additional information

Nil

Table 13.2 Breakpoints for antibiotic resistance of *Enterococcus* spp. in Animals

Test method used	
Disc diffusion	
E-test	
Agar dilution	
Broth dilution	x

Number of reporting laboratory: 1

Standards used for testing

NCCLS	x
other	

The methods are used for investigation of isolates from

Feedingstuff	
Animals	x
Food	
Humans	

Enterococcus spp	Standard for breakpoint (NCCLS,...)	Dilution method: Breakpoint concentration (µg/ml) Susceptible <=	Intermediate	Resistant >	Range tested concentration (µg/ml) lowest	highest
Tetracycline						
Tetracyclin	NCCLS			8	1	32
Phenicol						
Chloramphenicol	NCCLS			16	2	64
Florfenicol	NCCLS			16	2	32
Aminoglycosides						
Streptomycin	NCCLS			1024	128	2048
Gentamicin	NCCLS			512	128	2046
Kanamycin	NCCLS			1024	128	2048
Flavophospholipoles						
Flavomycin	NCCLS			8	0,5	32
Glykopeptides						
Teicoplanin	NCCLS			16	0,5	32
Vancomycin	NCCLS			16	1	32
Ionophores						
Salinomycin	NCCLS			8	1	32
Macrolides						
Erythromycin	NCCLS			4	1	32
Nitrofuranes						
Nitrofurantoin	NCCLS			64	32	256
Oligosaccharides						
Avilamycin	NCCLS			8	1	32
Polypeptides						
Bacitracin	NCCLS			64	8	256
ß-Lactams						
Penicillin	NCCLS			8	2	128
Streptogramines						
Synercid*	NCCLS			2	0,5	32

* Quinupristin/Dalfopristin

3.1. E. FAECALIS INDICATOR

3.1.1. General evaluation of the national situation

See chapter 3.0.1.

3.1.2. Antimicrobial resistance in *E. faecalis* isolates

Table 13.2.1 Antimicrobial susceptibility testing of *E. faecalis* - qualitative data

	E. faecalis					
	Cattle		Pigs		Poultry	
Isolates out of a monitoring programme (Yes / no)	yes		yes		yes	
Number of isolates available in the laboratory	84		144		136	
Antimicrobials:	N	% R	N	% R	N	% R
Tetracycline	13	15,5	85	59,0	110	80,9
Phenicol						
Chloramphenicol	0	0,0	11	7,6	2	1,5
Florfenicol	0	0,0	1	0,7	0	0,0
Aminoglycosides						
Streptomycin	2	2,4	28	19,4	22	16,2
Gentamicin	0	0,0	6	4,2	0	0,0
Kanamycin	0	0,0	14	9,7	6	4,4
Flavophospholipoles						
Flavomycin	13	15,5	12	8,3	4	2,9
Glykopeptides						
Teicoplanin	0	0,0	1	0,7	0	0,0
Vancomycin	0	0,0	1	0,7	0	0,0
Ionophores						
Salinomycin	0	0,0	2	1,4	0	0,0
Macrolides						
Erythromycin	2	2,4	27	18,8	38	27,9
Nitrofuranes						
Nitrofurantoin	1	1,2	2	1,4	0	0,0
Oligosaccharides						
Avilamycin	0	0,0	6	4,2	0	0,0
Polypeptides						
Bacitracin	11	13,1	27	18,8	58	42,6
ß-Lactams						
Penicillin	0	0,0	1	0,7	0	0,0
Number of multiresistant isolates	N	% R	N	% R	N	% R
fully sensitive	4	4,8	4	2,8	1	0,7
resistant to 1 antimicrobial	58	69,0	44	30,6	13	9,6
resistant to 2 antimicrobials	19	22,6	50	34,7	49	36,0
resistant to 3 antimicrobials	1	1,2	18	12,5	46	33,8
resistant to 4 antimicrobials	1	1,2	13	9,0	18	13,2
resistant to >4 antimicrobials	1	1,2	15	10,4	9	6,6

Table 13.2.2 Antimicrobial susceptibility testing of *E. faecalis* in Cattle (bovine animals) - at slaughter – monitoring programme - active monitoring - quantitative data [Dilution method]

***Enterococcs faecalis* in cattle**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	84

Agar diffusion	
Agar dilution	
Broth dilution	X

Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:

Antimicrobials:	N	% R	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracyclines																				
Tetracyclin	13	15,5						84,5					4,8	10,7						
Phenicol																				
Chloramphenicol	0	0,0							6,0	46,4	47,6									
Florfenicol	0	0,0							72,6	27,4										
Aminoglycosides																				
Streptomycin	2	2,4													97,6				1,2	1,2
Gentamicin	0	0,0													100,0					
Kanamycin	0	0,0													100,0					
Flavophospholipoles																				
Flavomycin	13	15,5					35,7	44,0	3,6	1,2			2,4	13,1						
Glykopeptides																				
Teicoplanin	0	0,0					100,0													
Vancomycin	0	0,0						73,8	26,2											
Ionophores																				
Salinomycin	0	0,0						92,9	7,1											
Macrolides																				
Erythromycin	2	2,4						79,8	17,9				2,4							
Nitrofuranes																				
Nitrofurantoin	1	1,2											96,4	2,4	1,2					
Oligosaccharides																				
Avilamycin	0	0,0						21,4	71,4	7,1										
Polypeptides																				
Bacitracin	11	13,1									14,3	6,0	15,5	51,2	11,9	1,2				
ß-Lactams																				
Penicillin	0	0,0							45,2	53,6	1,2									

Table 13.2.3 Antimicrobial susceptibility testing of *E. faecalis* in Pigs - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***Enterococcs faecalis* in pigs**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	144

Agar diffusion	
Agar dilution	
Broth dilution	X

Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:

Antimicrobials:	N	% R	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracyclines																				
Tetracyclin	85	59,0						41,0					7,6	51,4						
Phenicol																				
Chloramphenicol	11	7,6							0,7	29,9	61,8		4,2	3,5						
Florfenicol	1	0,7							61,1	38,2				0,7						
Aminoglycosides																				
Streptomycin	28	19,4													79,9	0,7			5,6	13,9
Gentamicin	6	4,2													93,1		2,8	2,1	2,1	
Kanamycin	14	9,7													89,6		0,7		0,7	9,0
Flavophospholipoles																				
Flavomycin	12	8,3					36,1	54,2	1,4					8,3						
Glykopeptides																				
Teicoplanin	1	0,7					97,9	1,4						0,7						
Vancomycin	1	0,7						83,3	16,0				0,7							
Ionophores																				
Salinomycin	2	1,4						84,7	8,3	1,4	4,2	0,7	0,7							
Macrolides																				
Erythromycin	27	18,8						63,2	16,7	1,4			18,8							
Nitrofuranes																				
Nitrofurantoin	2	1,4											93,1	5,6	0,7	0,7				
Oligosaccharides																				
Avilamycin	6	4,2						12,5	77,1	6,3		0,7	0,7	2,8						
Polypeptides																				
Bacitracin	27	18,8									2,8	6,3	16,0	56,3	17,4	1,4				
ß-Lactams																				
Penicillin	1	0,7							27,1	72,2					0,7					

Table 13.2.4 Antimicrobial susceptibility testing of *E. faecalis* in Poultry - at slaughter - monitoring programme – active monitoring (slaughter batch) - quantitative data [Dilution method]

***Enterococcs faecalis* in poultry**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	136

Agar diffusion	
Agar dilution	
Broth dilution	X

Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:

Antimicrobials:	N	% R	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracyclines																				
Tetracyclin	110	80,9						17,6			1,5	3,7	27,2	50,0						
Phenicol																				
Chloramphenicol	2	1,5							2,2	51,5	44,9			0,7	0,7					
Florfenicol	0	0,0							80,9	19,1										
Aminoglycosides																				
Streptomycin	22	16,2													83,8				8,8	7,4
Gentamicin	0	0,0													100,0					
Kanamycin	6	4,4													100,0					
Flavophospholipoles																				
Flavomycin	4	2,9					35,7	44,0	3,6	1,2			2,4	13,1						
Glykopeptides																				
Teicoplanin	0	0,0					100,0													
Vancomycin	0	0,0						66,2	33,1	0,7										
Ionophores																				
Salinomycin	0	0,0						70,6	8,8	16,9	3,7									
Macrolides																				
Erythromycin	38	27,9						55,9	8,1	8,1	5,1	2,2	20,6							
Nitrofuranes																				
Nitrofurantoin	0	0,0											97,8	2,2						
Oligosaccharides																				
Avilamycin	0	0,0						14,7	83,1	2,2										
Polypeptides																				
Bacitracin	58	42,6											13,2	44,1	12,5	30,1				
ß-Lactams																				
Penicillin	0	0,0							26,5	73,5										

3.2. E. FAECIUM INDICATOR

3.2.1. General evaluation of the national situation

See chapter 3.0.1

3.2.2. Antimicrobial resistance in *E. faecium* isolates

Table13.3.1 Antimicrobial susceptibility testing of *E. faecium* - qualitative data

	Enterococcus faecium					
	Cattle		Pigs		Poultry	
Isolates out of a monitoring programme (Yes / no)	yes		yes		yes	
Number of isolates available in the laboratory	146		191		22	
Antimicrobials:	N	% R	N	% R	N	% R
Tetracycline						
Tetracyclin	4	2,7	33	17,3	13	59,1
Phenicol						
Chloramphenicol	0	0,0	0	0,0	1	4,5
Florfenicol	0	0,0	0	0,0	0	0,0
Aminoglycosides						
Streptomycin	0	0,0	2	1,0	4	18,2
Gentamicin	0	0,0	0	0,0	0	0,0
Kanamycin	1	0,7	3	1,6	4	18,2
Glykopeptides						
Teicoplanin	0	0,0	0	0,0	0	0,0
Vancomycin	0	0,0	0	0,0	1	4,5
Ionophores						
Salinomycin	0	0,0	0	0,0	0	0,0
Macrolides						
Erythromycin	0	0,0	7	3,7	9	40,9
Nitrofuranes						
Nitrofurantoin	5	3,4	14	7,3	4	18,2
Oligosaccharides						
Avilamycin	0	0,0	1	0,5	0	0,0
Polypeptides						
Bacitracin	116	79,5	153	80,1	13	59,1
ß-Lactams						
Penicillin	0	0,0	4	2,1	6	27,3
Streptogramines						
Synercid*	62	42,5	68	35,6	8	36,4
Number of multiresistant isolates	N	% R	N	% R	N	% R
fully sensitive	4	2,7	2	1,0	0	0,0
resistant to 1 antimicrobial	18	12,3	18	9,4	1	4,5
resistant to 2 antimicrobials	64	43,8	85	44,5	6	27,3
resistant to 3 antimicrobials	57	39,0	70	36,6	6	27,3
resistant to 4 antimicrobials	3	2,1	12	6,3	4	18,2
resistant to >4 antimicrobials	0		4	2,1	5	22,7

* Quinupristin/Dalfopristin

Table 13.3.2 Antimicrobial susceptibility testing of E. faecium in Cattle (bovine animals) - at slaughter – monitoring programme - active monitoring - quantitative data [Dilution method]

Enterococcs faecium **in cattle**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	146

Agar diffusion	
Agar dilution	
Broth dilution	X

Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:

Antimicrobials:	N	% R	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracyclines																				
Tetracyclin	4	2,7						96,6	0,7				0,7	2,1						
Phenicol																				
Chloramphenicol	0	0							1,4	32,2	66,4									
Florfenicol	0	0							53,4	46,6										
Aminoglycosides																				
Streptomycin	0	0													100,0					
Gentamicin	0	0													100,0					
Kanamycin	1	0,7													86,3	11,6	1,4			0,7
Glykopeptides																				
Teicoplanin	0	0					99,3	0,7												
Vancomycin	0	0						52,1	8,2	31,5	8,2									
Ionophores																				
Salinomycin	0	0						71,9	28,1											
Macrolides																				
Erythromycin	0	0						64,4	30,8	4,8										
Nitrofuranes																				
Nitrofurantoin	5	3,4											63,0	33,6	3,4					
Oligosaccharides																				
Avilamycin	0	0						6,8	41,1	50,7	1,4									
Polypeptides																				
Bacitracin	116	79,5									4,1	2,1	2,7	11,6	61,0	17,1	1,4			
ß-Lactams																				
Penicillin	0	0							71,2	24,7	4,1									
Streptogramines																				
Synercid*	62	42,5					21,9	4,1	31,5	41,8	0,7									

* Quinupristin/Dalfopristin

Table 13.3.3 Antimicrobial susceptibility testing of E. faecium in Pigs - at slaughter - monitoring programme – active monitoring - quantitative data [Dilution method]

***Enterococcs faecium* in pigs**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	191

Agar diffusion	
Agar dilution	
Broth dilution	X

Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:

Antimicrobials:	N	% R	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracyclines																				
Tetracyclin	33	17,3						81,7		0,5	0,5	0,5	3,1	13,6						
Phenicol																				
Chloramphenicol	0	0,0								26,7	72,3	1,0								
Florfenicol	0	0,0							33,5	66,5										
Aminoglycosides																				
Streptomycin	2	1,0													94,2	0,5	1,6	2,6		1,0
Gentamicin	0	0,0													100,0					
Kanamycin	3	1,6													77,0	16,2	5,2			1,6
Glykopeptides																				
Teicoplanin	0	0,0					97,9	2,1												
Vancomycin	0	0,0						84,3	5,2	6,3	4,2									
Ionophores																				
Salinomycin	0	0,0						38,7	57,1	3,1	1,0									
Macrolides																				
Erythromycin	7	3,7						28,3	52,9	15,2	0,5	0,5		2,6						
Nitrofuranes																				
Nitrofurantoin	14	7,3											17,8	74,9	6,8	0,5				
Oligosaccharides																				
Avilamycin	1	0,5						4,7	27,7	66,0	1,0			0,5						
Polypeptides																				
Bacitracin	153	80,1									2,1	2,6	2,6	12,6	51,3	26,7	2,1			
ß-Lactams																				
Penicillin	4	2,1							40,8	48,2	8,9	2,1								
Streptogramines																				
Synercid*	68	35,6					14,7	1,6	48,2	35,1	0,5									

* Quinupristin/Dalfopristin

Table 13.3.4 Antimicrobial susceptibility testing of E. faecium in Poultry - at slaughter - monitoring programme – active monitoring (slaughter batch) - quantitative data [Dilution method]

***Enterococcs faecium* in poultry**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	22

Agar diffusion	
Agar dilution	
Broth dilution	X

Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:

Antimicrobials:	N	% R	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracyclines																				
Tetracyclin	13	59,1						36,4			4,5		9,1	50,0						
Phenicol																				
Chloramphenicol	1	4,5							4,5	36,4	45,5	9,1	4,5							
Florfenicol	0	0							63,6	31,8	4,5									
Aminoglycosides																				
Streptomycin	4	18,2													77,3			4,5	13,6	4,5
Gentamicin	0	0													100,0					
Kanamycin	4	18,2													50,0	31,8				18,2
Glykopeptides																				
Teicoplanin	0	0					95,5					4,5								
Vancomycin	1	4,5						86,4	4,5	4,5				4,5						
Ionophores																				
Salinomycin	0	0						54,5	4,5	18,2	22,7									
Macrolides																				
Erythromycin	9	40,9						54,5	4,5		9,1			31,8						
Nitrofuranes																				
Nitrofurantoin	4	18,2											45,5	36,4	18,2					
Oligosaccharides																				
Avilamycin	0	0						18,2	40,9	40,9										
Polypeptides																				
Bacitracin	13	59,1									9,1		4,5	27,3	27,3	9,1	22,7			
ß-Lactams																				
Penicillin	6	27,3							59,1	4,5	9,1	13,6	13,6							
Streptogramines																				
Synercid*	8	36,4					27,3	13,6	22,7	31,8	4,5									

* Quinupristin/Dalfopristin

3.4. E. COLI *INDICATORS*

3.4.1. 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.

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

No valid data of previous years available for comparison.

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

No valid data available for comparison

Recent actions taken to control the zoonoses

An Austrian wide monitoring program on the trends of antimicrobial resistance of enterococci 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: 39.514/85-IV/B/8/04 (Zoonosenüberwachungsprogramme gemäß RL 2003/99/EG; Durchführung von einheitlichen Überwachungsprogrammen zu ausgewählten Zoonosen sowie diesbezüglicher Antibiotikaresistenzen). The sampling was carried out from 14 May to 26 November 2004 and follow up programs will be realised in the following 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

3.4.2. Antimicrobial resistance in *Escherichia coli* isolates

A. Antimicrobial resistance of *E. coli* in animal - Cattle (bovine animals) – at slaughter - monitoring programme - active monitoring

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 prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 196 *E. coli* isolates from bovine animals were required.

To obtain this number of isolates, as sample size, 421 slaughtered bovine animals had to be tested, calculated on approximately 600.000 slaughtered bovine animals in 2002 in Austria, and an *E. coli* prevalence of 50% by 95% confidence and 5% type one error.

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 75 abattoirs in which more than 500 bovine animals were slaughtered in 2002 accounted for more than 95% of the total annual bovine production. Sampling was performed in the 43 of the 75 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 32 samplings were distributed over the 43 abattoirs.

Type of specimen taken

Colon containing 50 to 100 grams of feces.

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 plastik 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

216 *E. coli* isolates were chosen randomly out of the 366 obtained in the monitoring program.

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.

Control program/mechanisms

The control program/strategies in place

Samples from food animals were monitored for antimicrobial residues according to a randomized sampling scheme (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

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

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

No valid data available for comparison

Additional information

Nil

B. Antimicrobial resistance of *E. coli* in animal - Pigs - at slaughter - monitoring programme - active monitoring

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 prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 203 *E. coli* isolates from pigs were required.

To obtain this number of isolates, as sample size 416 slaughtered pigs had to be tested, calculated on approximately 4.300.000 slaughtered pigs in 2002 in Austria and an *E. coli* prevalence of 50% by 95% confidence and 5% type one error.

The sampling had been stratified on the number of slaughtering by abattoirs all over Austria 2004 Report on trends and sources of zoonoses study.

In Austria, all 77 abattoirs in which more than 3.500 pigs were slaughtered in 2002 accounted for more than 95% of the total annual pig production. Sampling was performed in the 53 of the 77 abattoirs excluding those in which only one sampling in the whole period of the study would have been carried out. The remaining 24 samplings were distributed over the 53 abattoirs.

Type of specimen taken

Colon containing 50 to 100 grams of feces.

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 plastik 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

224 *E. coli* isolates were chosen randomly out of the 394 obtained in the monitoring program.

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 (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data available for comparison

Additional information

Nil

C. Antimicrobial resistance of *E. coli* in animal - Poultry - at slaughter - monitoring programme - active monitoring (slaughter batch)

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 prevalence for resistance in antimicrobials of 50% by 95% confidence and 5% type one error, 203 *Campylobacter* isolates from poultry were required.

To obtain this number of isolates, as a primary sample size, 416 slaughter batches of poultry had to be tested, calculated on approximately 8000 slaughter batches of poultry in 2002 in Austria, and an *E. coli* prevalence of 50% by 95% confidence and 5% type one error.

Caeca of 10 animals as the secondary sample size that gives the number of birds per batch to be sampled had been assessed 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. The 8 slaughter plants included in the surveillance 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 plastik 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

224 *E. coli* isolates were chosen randomly out of the 346 obtained in the monitoring program.

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 (GZ: 39.186/1-IV/B/7/04, Rückstandsuntersuchungsdurchführungserlass)

Recent actions taken to control the zoonoses

Resistance monitoring was started in Austria in 2004.

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

No valid data of previous years available for comparison.

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

No valid data of previous years available for comparison.

Additional information

Nil

Table 13.1 Breakpoints used for antibiotic resistance testing of *E. coli* in Animals

Test method used	
Disc diffusion	
E-test	
Agar dilution	
Broth dilution	x

Number of reporting laboratory 1

Standards used for testing	
NCCLS	x
other	

The methods are used for investigation of isolates from	
Feedingstuff	
Animals	x
Food	
Humans	

Escherichia coli	**Standard for breakpoint (NCCLS,...)**	**Dilution method**				
		Breakpoint concentration (µg/ml)			**Range tested concentration (µg/ml)**	
		Susceptible <=	**Intermediate**	**Resistant >**	**lowest**	**highest**
Tetracyclin	NCCLS			8	2	32
Phenicol						
Chloramphenicol	NCCLS			16	2	64
Florfenicol	NCCLS			16	2	64
ß-Lactam						
Ampicillin	NCCLS			16	1	32
Amoxycillin/ Clavulansäure	NCCLS			16	2	32
Ampramycin	NCCLS			8	4	64
Cephalosporins						
Cephalotin	NCCLS			16	2	64
Ceftiofur	NCCLS			4	0,5	8
Fluoroquinolones						
Ciprofloxacin	NCCLS			2	0,03	4
Sulfonamides						
Trimethoprim (TMP)	NCCLS			8	4	32
Sulfamethoxazol	NCCLS			256	64	1024
Aminoglycosides						
Streptomycin	NCCLS			16	4	64
Gentamicin	NCCLS			8	1	32
Neomycin	NCCLS			8	2	32
Colistin	NCCLS			8	4	64
Quinolones						
Nalidixic acid	NCCLS			16	8	128
Spectinomycin	NCCLS			64	4	128

Table 13.1.1 Antimicrobial susceptibility testing of *E. coli* in animals

	E. coli					
	Cattle		Pigs		Poultry	
Isolates out of a monitoring programme (Yes / no)	yes		yes		yes	
Number of isolates available in the laboratory	212		217		216	
Antimicrobials:	N	% R	N	% R	N	% R
Tetracycline	11	5,2	126	58,1	76	35,2
Tetracyclin						
Phenicol						
Chloramphenicol	0	0,0	8	3,7	10	4,6
Florfenicol	0	0,0	0	0,0	1	0,5
ß-Lactam						
Ampicillin	4	1,9	13	6,0	51	23,6
Amoxycillin/ Clavulansäure	1	0,5	0	0,0	2	0,9
Ampramycin	1	0,5	4	1,8	0	0
Cephalosporins						
Cephalotin	2	0,9	1	0,5	5	2,3
Ceftiofur	0	0,0	0	0,0	0	0
Fluoroquinolones						
Ciprofloxacin	0	0,0	2	0,9	7	3,2
Sulfonamides						
Trimethoprim (TMP)	2	0,9	19	8,8	31	14,4
Sulfamethoxazol	5	2,4	65	30,0	67	31
Aminoglycosides						
Streptomycin	7	3,3	118	54,4	66	30,6
Gentamicin	0	0,0	2	0,9	5	2,3
Neomycin	0	0,0	5	2,3	13	6
Colistin	1	0,5	1	0,5	0	0
Quinolones						
Nalidixic acid	2	0,9	5	2,3	89	41,2
Spectinomycin	3	1,4	78	35,9	17	7,9
Number of multiresistant isolates	N	% R	N	% R	N	% R
fully sensitive	194	91,5	61	28,1	58	26,9
resistant to 1 antimicrobial	10	4,7	28	12,9	52	24,1
resistant to 2 antimicrobials	1	0,5	39	18,0	37	17,1
resistant to 3 antimicrobials	2	0,9	40	18,4	19	8,8
resistant to 4 antimicrobials	4	1,9	30	13,8	19	8,8
resistant to >4 antimicrobials	1	0,5	19	8,8	31	14,4

Table13.1.2 Antimicrobial susceptibility testing of E.coli in Cattle (bovine animals) - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***E. coli* in cattle**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	212

Antimicrobials:	N	% R	Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:																	
			<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracycline	11	5,2							94,8				0,9	4,2						
Phenicol																				
Chloramphenicol	0	0,0							3,8	38,2	58,0									
Florfenicol	0	0,0							4,2	58,0	37,7									
ß-Lactam																				
Ampicillin	4	1,9						2,4	52,4	42,0	1,4			1,9						
Amoxycillin/ Clavulansäure	1	0,5							23,6	70,3	5,2	0,5		0,5						
Ampramycin	1	0,5								95,3	4,2		0,5							
Cephalosporins																				
Cephalotin	2	0,9							0,5	19,8	65,6	13,2	0,5	0,5						
Ceftiofur	0	0,0						99,1	0,5	0,5										
Fluoroquinolones																				
Ciprofloxacin	0	0,0	99,1	0,5	0,5															
Sulfonamides																				
Trimethoprim (TMP)	2	0,9								85,6				14,4						
Sulfamethoxazol	5	2,4												96,7	0,9				2,4	
Aminoglycosides																				
Streptomycin	7	3,3								79,2	16,5	0,9	0,9	1,4	0,9					
Gentamicin	0	0,0						97,6	2,4											
Neomycin	0	0,0							99,5	0,5										
Colistin	1	0,5								98,6	0,9				0,5					
Quinolones																				
Nalidixic acid	2	0,9									98,6	0,5	0,9							
Spectinomycin	3	1,4									10,4	83,5	4,2	0,5	0,5	0,9				

Table 13.1.3 Antimicrobial susceptibility testing of E.coli in Pigs - at slaughter - monitoring programme - active monitoring - quantitative data [Dilution method]

***E. coli* in pigs**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	217

Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:

Antimicrobials:	N	% R	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracycline																				
Tetracyclin	126	58,1							41,5		0,5		6,9	51,2						
Phenicol																				
Chloramphenicol	8	3,7							6,9	38,7	49,3	1,4	0,9	0,9	1,8					
Florfenicol	0	0,0							9,7	52,1	37,3	0,9								
ß-Lactam																				
Ampicillin	13	6,0						6,5	51,2	35,5	0,9			6,0						
Amoxycillin/ Clavulansäure	0	0,0							35,9	54,4	9,7									
Ampramycin	4	1,8								89,9	8,3	0,5	0,5		0,9					
Cephalosporins																				
Cephalotin	1	0,5							5,5	24,0	55,8	14,3	0,5							
Ceftiofur	0	0,0					100,0													
Fluoroquinolones																				
Ciprofloxacin	2	0,9	96,8	0,9	1,4						0,9									
Sulfonamides																				
Trimethoprim (TMP)	19	8,8								91,2					8,8					
Sulfamethoxazol	65	30,0												69,6	0,5					30,0
Aminoglycosides																				
Streptomycin	118	54,4								30,9	11,1	3,7	9,7	24,4	20,3					
Gentamicin	2	0,9						90,3	6,5	1,4	0,9	0,9								
Neomycin	5	2,3							95,4	1,4	0,9		1,4	0,9						
Colistin	1	0,5								99,5					0,5					
Quinolones																				
Nalidixic acid	5	2,3									95,4	2,3		0,5	0,5	1,4				
Spectinomycin	78	35,9									7,4	44,7	10,6	1,4	16,6	19,4				

Table 13.1.4 Antimicrobial susceptibility testing of E.coli in Poultry - at slaughter - monitoring programme – active monitoring (slaughter batch) - quantitative data [Dilution method]

***E. coli* in poultry**

Isolates out of a monitoring programme (Yes / no)	yes
Number of isolates available in the laboratory	216

Dilution method (concentration (µg/ml)), percentage of isolates with a concentration of inhibition equal to:

Antimicrobials:	N	% R	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracycline																				
Tetracyclin	76	35,2							63,0	1,4	0,5		3,2	31,9						
Phenicol																				
Chloramphenicol	10	4,6							2,3	37,5	51,4	4,2	0,5	0,9	3,2					
Florfenicol	1	0,5							6,0	54,6	36,1	2,8	0,5							
ß-Lactam																				
Ampicillin	51	23,6						3,7	40,3	31,0	1,4		0,5	23,1						
Amoxycillin/ Clavulansäure	2	0,9							27,8	51,9	19,0	0,5		0,9						
Ampramycin	0	0								96,8	3,2									
Cephalosporins																				
Cephalotin	5	2,3							1,4	23,1	49,5	23,6	1,4		0,9					
Ceftiofur	0	0					96,8	2,3		0,9										
Fluoroquinolones																				
Ciprofloxacin	7	3,2	58,3	2,3	13,4	11,6	8,3	2,8		0,9	2,3									
Sulfonamides																				
Trimethoprim (TMP)	31	14,4								85,6				14,4						
Sulfamethoxazol	67	31												69,0					31,0	
Aminoglycosides																				
Streptomycin	66	30,6								49,1	15,7	4,6	12,0	9,3	9,3					
Gentamicin	5	2,3						96,8	0,9			1,4	0,9							
Neomycin	13	6							92,6	1,4			2,8	3,2						
Colistin	0	0								100,0										
Quinolones																				
Nalidixic acid	89	41,2									58,3	0,5	1,9	6,5	13,0	19,9				
Spectinomycin	17	7,9									14,4		71,3	4,6	1,9	2,8	5,1			

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 (Zoonosegesetz) 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 (481 of 539) of the 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

No data from previous years available for comparison.

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, 12% 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

Much P, Berghold C, Krassnig G, Schweighardt H, Wenzl H, Allerberger F. 2005. An Austrian outbreak of *Salmonella* Enteritidis phage type 36 in 2004. Wien. Klin. Wochenschr. 117, 599-603.

Control measures or other actions taken to improve the situation

The Federal Ministry of Health is working on a new law, which will improve the situation by clarifying the responsibilities for investigations of food borne outbreaks, which affect multiple districts and provinces.

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	number of persons ill	number of persons died	number of persons in hospital	Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
Camp. jejuni	0	1	6	0	0	chicken, turkey, ice-cream	X			restaurant	lack of hygienic measures
Camp. jejuni	0	1	2	0	0	various kinds of meat	X		epidemiologic coherence	china-restaurant	
Camp. jejuni	0	3	8	0	0	fish, raw milk, chicken				household	
Camp. jejuni	0	15	32	0	3	unknown				unknown	
Camp. jejuni/coli	0	2	6	0	0	unknown				unknown	
Campylobacter	0	1	2	0	0	unknown	X			restaurant	
Campylobacter	0	1	2		0	kebab	X			restaurant	
Campylobacter	0	1	2			turkey	X			restaurant	
Campylobacter	0	1	2	0	0	steak	X			Slovenia	
Campylobacter	0	33	68	0	11	unknown				unknown	
Campylobacter	1	0	2	0	0	parfait containing eggs	X			holiday camp	
Campylobacter	1	0	4		0	potato salad, chicken	X			restaurant	two coherent cases

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
Campylobacter	2	23	53	0	4	chicken, ice-cream, fish ,pasta, cream pie, eggs, sausage, salad with egg				household	
EHEC	0	1	4			beef-fondue	X		epidemiologically elicited	household	self-made
EHEC	0	2	5			unknown				unknown	
Hepatitis-A-Virus	1	0	13			unknown	Ø	Ø	epidemiologically confirmed	bakery	lack of hygienic measures
S. Brandenburg	0	1	3	0	0	parfait containing fish	X			household	
S. Coeln	0	1	2	0	1	eggs	X		epidemiological evidence	household	
S. Dundee	0	1	2	0	0	unknown				household	
S. Enteritidis	0	1	4			ice cream or soup	X			restaurant	
S. Enteritidis	0	1	2		0	pancakes with ice cream		X	AGES	Italian restaurant	
S. Enteritidis	0	1	2		0	unknown		X	AGES		smear infection
S. Enteritidis	0	1	2		2	tiramisu		X	KH Horn		family celebration
S. Enteritidis	0	1	2		0			X	AGES	Greece	

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Enteritidis	0	1	3		0	Hamburger at home (Mc. Donald's)		X	AGES		
S. Enteritidis	0	1	3		0	salads with dressing		X	KH Krems		holiday in Croatia
S. Enteritidis	0	1	3		3	cream rolls		X	AGES		school celebration
S. Enteritidis	0	1	3		0			X	AGES	china-restaurant	
S. Enteritidis	0	1	2		0			X	AGES	environmental investigation	
S. Enteritidis	0	1	2		0	pancake dough		X	AGES		
S. Enteritidis	0	1	2		yes			X	AGES	camping place in Hungary	
S. Enteritidis	0	1	2		0			X	laboratory Dr. Kosak	Yugoslavia	
S. Enteritidis	0	1	2		0			X	AGES	Slovenia	
S. Enteritidis	0	1	2			cake	X			abroad	
S. Enteritidis	0	1	2			unknown				abroad	
S. Enteritidis	0	42	99	0	1	unknown				unknown	
S. Enteritidis	1	0	25	0	0	unknown	X			Greece	
S. Enteritidis	1	0	2	0	1	salads with mayonnaise	X				birthday party

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Enteritidis	2	24	81	0		banana cake, egg, fish, baked fungi, deep frozen Cordonbleu, baked vegetables, sauce tartar, chicken, tiramisu, Malakoff pie, turkey, cake dough, pancake dough, mayonnaise, dumplings				household	
S. Enteritidis (OD)	0	1	2		1	various kinds of sausages	X			restaurant	
S. Enteritidis (OD)	0	1	2		1	liver loaf-burger	X			takeaway	
S. Enteritidis (OD)	0	1	2			unknown				Greece	
S. Enteritidis (OD)	0	1	2			unknown				Prague	
S. Enteritidis (OD)	0	2	4	0	0	unknown				unknown	
S. Enteritidis + S. Heidelberg	0	1	2	0	0	unknown	X			household	
S. Enteritidis PT 1	0	1	2			fish	X			Majorca	

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Enteritidis PT 1	0	1	2			prawn	X			Majorca	
S. Enteritidis PT 1	0	1	5	0	2	chicken	X			household	
S. Enteritidis PT 1	0	4	9	0	3	unknown				household	
S. Enteritidis PT 1	1	0	8			eggs		X	AGES,Graz	LLA Rotholz	
S. Enteritidis PT 1	1	0	3	0	1	unknown	X			nursing-home	eventually through staff
S. Enteritidis PT 10	0	1	2			unknown	Ø	Ø		unknown	
S. Enteritidis PT 11	0	1	2	0	1	egg-product, tiramisu	X			household	
S. Enteritidis PT 12	0	1	2			unknown	Ø	Ø		Croatia	
S. Enteritidis PT 12	0	1	4			unknown	Ø	Ø		unknown	
S. Enteritidis PT 14b	0	1	2		2	minced meat	X			household	
S. Enteritidis PT 14b	0	1	2	0	0	unknown				household	
S. Enteritidis PT 14b	0	1	2		2	minced meat or fish	X			Greece	
S. Enteritidis PT 14b	1	0	8	0	2	tiramisu, fried eggs		X	in processed food PT 14b	Italian restaurant	raw eggs
S. Enteritidis PT 14b	2	0	7	0	0	smoked tuna	X			sanatorium	
S. Enteritidis PT 21	0	4	12	0	2	unknown	X			holiday in Kos	
S. Enteritidis PT 21	0	6	12	0	0	unknown				unknown	
S. Enteritidis PT 21	1	0	2	0	0	cake dough		X	laying battery PT 21	Kindergarten	raw eggs
S. Enteritidis PT 21	1	0	14	0	4	tiramisu	X		epidemiologic coherence	School	raw eggs

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Enteritidis PT 21	1	7	26	0	9	tiramisu, chicken, chicken soup, cake dough, soft-boiled eggs				household	
S. Enteritidis PT 21	1	0	21	0	3		X		epidemiologic coherence	hospital with day nursery	lack in hygiene
S. Enteritidis PT 29	0	1	2	0	1	pasta	X			household	raw eggs
S. Enteritidis PT 36	1	0	21	0	2	eggs		X	infected laying flock identified; PT 36 cultured from eggs; connection between cases and infected flock could be proven for 20 of 21 cases	household	consumption of raw (e.g. mayonnaise) or soft boiled eggs
S. Enteritidis PT 4	0	12	32	0	4	unknown	X			household	
S. Enteritidis PT 4	0	1	2		1	Chicken McNuggets	X			Lokal(Mc Donald's??)	
S. Enteritidis PT 4	0	1	2		1	eggs	X			china-restaurant	
S. Enteritidis PT 4	0	1	2	0	1	chicken	X		epidemiologic close of argument	Turkish-restaurant	
S. Enteritidis PT 4	0	1	2		0	chicken	X			china-restaurant	
S. Enteritidis PT 4	0	1	2			unknown				restaurant	

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Enteritidis PT 4	0	1	2			unknown				abroad	
S. Enteritidis PT 4	0	1	2		1	duck	X			china-restaurant	
S. Enteritidis PT 4	0	1	2			tartar sauce	X			Czech republic	
S. Enteritidis PT 4	0	1	2		1	fried eggs	X			Kalterer See/I	
S. Enteritidis PT 4	1	0	11	0	0	pasta	X		relatively identical date of onset	restaurant	
S. Enteritidis PT 4	1	0	20	0	2	dumplings	X		no cases in children that did not consume dumplings	holiday camp	dumplings not thoroughly cooked
S. Enteritidis PT 4	1	0	2		1	ice-cream	X			Tunisia	
S. Enteritidis PT 4	1	0	2			grilled meat	X			restaurant	
S. Enteritidis PT 4	1	0	8	0	1	wedding-cake		X	PT 4,7 in laying battery	restaurant	
S. Enteritidis PT 4	1	0	5			potato salad	X		laboratory	restaurant	
S. Enteritidis PT 4	1	0	2	0	1	unknown				Greece	
S. Enteritidis PT 4	1	0	2		1	unknown				nursing-home	
S. Enteritidis PT 4	1	0	3			pizza with fungi	X			restaurant	
S. Enteritidis PT 4	1	0	2			salad	X			Greece	
S. Enteritidis PT 4	1	0	2	0	0	unbekannt	Ø	Ø	epidemiologic close of argument	hotel	HACCP-system is not documented
S. Enteritidis PT 4	2	0	13	0	0	Calamari	X	X		nursing-home, restaurant	in the nursing-home through staff
S. Enteritidis PT 4	2	42	121	0	19	unknown				unknown	

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Enteritidis PT 4	2	31	99	0	24	cream roll, water, turkey, tiramisu, pasta, pizza, eggs, omelette, cake, potato salad, chicken, grilled meat, minced meat, ice cream				household	
S. Enteritidis PT 46	1	0	4		1	cheese dumplings		X	laboratory Dr. Kosak	restaurant	
S. Enteritidis PT 46	1	0	2			French fries	X	Ø		Mc Donald's	
S. Enteritidis PT 5 a	0	1	3			unknown	Ø	Ø		unknown	
S. Enteritidis PT 6	0	1	2			beef tartar	X			restaurant	
S. Enteritidis PT 6	0	1	2		0	chicken soup	X			household	
S. Enteritidis PT 6	0	1	2			unknown				abroad	
S. Enteritidis PT 6	0	3	10		3	unknown					
S. Enteritidis PT 6	0	1	2			unknown	Ø	Ø		Czech republic	
S. Enteritidis PT 6	0	1	2			unknown	Ø	Ø		Turkey	
S. Enteritidis PT 6	0	1	2		0	unknown				unknown	
S. Enteritidis PT 6	0	1	3		2	fried eggs with liver loaf	X			abroad	
S. Enteritidis PT 6	0	1	2	0	1	unknown				abroad	

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Enteritidis PT 6a	0	1	3			unknown				Greece	
S. Enteritidis PT 7	0	1	2		1	unknown				unknown	
S. Enteritidis PT 8	0	13	35	0	10	unknown	X			household, holiday, bakery	
S. Enteritidis PT 8	0	1	3			unknown	X			bakery	
S. Enteritidis PT 8	0	1	2			ice cream or soup	X			restaurant	
S. Enteritidis PT 8	0	1	2		2	strawberry ice cream-cake	X			confectionery	
S. Enteritidis PT 8	0	1	4			grilled chicken	X		epidemiologically confirmed	takeaway	lack of hygiene in processing
S. Enteritidis PT 8	0	1	2			chicken	X			china restaurant	
S. Enteritidis PT 8	0	1	2			unknown				holiday	
S. Enteritidis PT 8	0	1	2	0	0	unknown	Ø	Ø		restaurant	trip to Amstetten/Nö
S. Enteritidis PT 8	0	1	3		1	tiramisu	X			cafe	
S. Enteritidis PT 8	0	50	120	1	11	unknown				unknown	
S. Enteritidis PT 8	1	0	3			eggs	X			farm	
S. Enteritidis PT 8	1	0	9		3	mayonnaise	X			takeaway	homemade
S. Enteritidis PT 8	1	0	6		3	chocolate-nut-cake	X			party	
S. Enteritidis PT 8	1	0	7	0	0	confection of pastry	X		epidemiologic coherence	household	half boiled eggs
S. Enteritidis PT 8	1	0	2	0	0	pasta	X		epidemiologic close of argument	restaurant	

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Enteritidis PT 8	1	0	2	0	0	unknown	Ø	Ø	epidemiologic close of argument	hotel	HACCP-system is not documented
S. Enteritidis PT 8	1	16	51	0	9	tiramisu, soft-boiled egg, mayonnaise, boiled egg, cake, chicken, grilled meat, cream pie, banana-milkshake,				household	
S. Enteritidis PT 8	2	0	25	0	1	chicken, unknown	X		epidemiologically confirmed	nursing-home	household failure HACCP
S. Enteritidis PT 8 + S. Enteritidis U	0	1	2	0	0		Ø	Ø		restaurant	
S. Enteritidis PT U	0	1	3	0	1	unknown				household	
S. Enteritidis RDNC	0	3	7	0	2	cream pie, turkey, tiramisu, eggs,				household	
S. Enteritidis RDNC	0	4	15	0	4	unknown				household	
S. Enteritidis RDNC + 5 c	0	1	2	0	0	unknown					
S. Enteritidis U	0	1	2				Ø	Ø	National Reference Laboratory for Salmonella	Turkey	

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Gr. C2	0	2	4	0	1	unknown				unknown	
S. Gr. D	0	1	2			lasagne	X			restaurant	eggs
S. Gr. D	0	1	2			unknown				restaurant or market	
S. Gr. D	0	1	3			unknown				unknown	
S. Gr. D	0	3	7	0	0	potato cheese, chicken, Tiramisu				household	
S. Gr. D	1	0	3			cream	X			restaurant	
S. Gr. E	0	1	2	0	0	tiramisu	X		no confirmation through stool-samples	household	
S. Hadar and S. Enteritidis	0	1	2	0	0	unknown	Ø	Ø		household	
S. Infantis	0	1	2			unknown				Turkey	
S. Infantis	0	5	14	0	3	unknown				household	
S. Infantis	1	0	2	0	0	unknown				kindergarten	
S. Leith	1	0	2	0	0	mussels	X			restaurant in Croatia	
S. Newport	0	1	2			mussels or fish	X			Croatia	
S. OMC S. IIIb 38	1	0	2			unknown				cafeteria	
S. Poona	0	1	2	0	1	unknown				household	
S. Thompson	0	1	4	0	0		X		epidemiologic coherence	residential accommodation	
S. Typhimurium	0	1	2		2	unknown		X	hospital Wr. Neustadt		

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital						
S. Typhimurium	0	2	7	0	1	chicken, Malakoff pie		X	AGES	household	
S. Typhimurium	0	1	2		1	unknown				restaurant	
S. Typhimurium DT 120	0	1	4		4	mayonnaise	X			household	homemade
S. Typhimurium DT 120	0	2	4		2	unknown					
S. Typhimurium DT 120	0	1	2			unknown				abroad	
S. Typhimurium DT 208	0	1	2	0	0	ice cream	X			household	
S. Typhimurium DT 3	0	2	4		1	unknown					
S. Typhimurium DT 4	0	2	4	0	0	unknown				household	
S. Typhimurium DT 41	0	1	2			unknown	X		same onset-date	household	
S. Typhimurium DT 46	0	1	4	0	0	ice cream	X			soda-shop	
S. Typhimurium DT 46	0	3	6	0	2	dumplings, eggs, unknown	X			household, Italian restaurant	
S. Typhimurium DT 46	0	5	10		5	unknown					
S. Typhimurium DT 46	0	2	9	0	0	chicken, soft-boiled egg, tiramisu				household	
S. Typhimurium DT 46	1	0	10		6	wedding-cake	X			restaurant	
S. Typhimurium DT 46	1	0	4		4	minced beef, chicken	X			asylum-seekers accommodation	

Causative agent	General outbreak	Family outbreak	number of persons			Source	Sus-pected	Con-firmed	Type of evidence	Location of exposure	Contributing factors
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S. Typhimurium DT 46	2	0	9	0	5	minced meat, unknown	X	X	one sample positive	restaurant	
S. Typhimurium DT 6	1	0	6		1	duck eggs, turkey, duck		X	laboratory; microbiologically confirmed	household	livestock husbandry and failure of HACCP in school
S. Typhimurium DT U291	1	0	233	0	0	Tiramisu, walnut cake		X	case series data	restaurant, household	
S. Typhimurium RDNC	0	2	4	0	0	unknown				household	
Salmonella	0	1	3			unknown				Tunisia	
Salmonella	0	1	2			unknown				Prague	
Salmonella	0	10	25	0	2	unknown				unknown	
Salmonella	1	6	18	0	7	eggs, turkey, grilled meat, cream roll				household	
Yersinia	0	1	3	0	1	unknown				household	
Yersinia enterocolitica	0	1	2	0	0	unknown			stool-sample confirmation	household	