

12. Antimicrobial resistance in zoonotic agents

15 Member States and Norway provided information on the occurrence of antimicrobial resistance in *Salmonella*. 4 Member States, one region of a Member States and Norway investigated *Campylobacter*. In 2003, for the first time, data on antimicrobial resistance in *Escherichia coli* were collected and 8 Member States and Norway provided this information. Three new Member States provided voluntary information on *Salmonella* and 2 new Member States reported on *Escherichia coli*.

Quantitative data, that is the minimal inhibitory concentrations (MIC) measured by using dilution methods, were reported from 8 Member States and Norway countries for *Salmonella* 4 Member States and Norway for *Campylobacter* and from 5 Member States and Norway for *Escherichia coli*.

12.1. *Salmonella*

Source of information

In Finland, Sweden and Norway a very limited number of animal derived isolates of *Salmonella* were available for testing, a fact which is attributed to the favourable situation in the country. Luxembourg, Latvia and Lithuania investigated less than 12, Belgium, Greece, Ireland and Slovenia less than 350 isolates. In the other countries more than 1000 isolates of *Salmonella* were investigated.

Strains were collected by different approaches. Typically, isolates were selected out of those available at the National Reference Laboratory (NRL) or all the isolates were tested (Austria, Belgium, Finland, Germany, Norway). These strains included the positives from monitoring programmes (Denmark, Finland, Sweden, Norway, England and Wales) and those from clinical cases (Denmark, United Kingdom, Norway). In Denmark, Finland, Norway, Sweden and United Kingdom it is ensured, that only the first isolate from a particular premises within a set period of time is included in the monitoring for antimicrobial resistance. This is done to avoid bias in the figures where large numbers of (similar) isolates are recovered from single premises because of the intensity of sampling. It is assumed that all isolates are taken from animals at the level of primary production. In Belgium, this is not the case. In France, data are derived from a network of laboratories involved in the testing for antimicrobial resistance.

Denmark, Finland, The Netherlands, Sweden and Norway run national monitoring programs on antimicrobial susceptibility testing, DANMAP, FINRES, MARAN, SVARM, NORM VET. The results in combination with consumption and usage of antimicrobials are published annually or in other intervals.

Comments to the Tables AB 1 to AB 51:

- Some countries provided different data sets. The same species could be investigated by different laboratories in the frame of a monitoring program or due to other reasons. In this case, separate data sets are given in the tables for the country.
- Some countries reported on all *Salmonella* isolates tested together, others on specific serovars only. To enable some comparison, in Tables AB 5 to AB 9, data are given in two lines. In the row for *Salmonella*, the overall results are given as reported, and in the line *Salmonella #* results reported on the individual *Salmonella* serovars are summarised.
- The column investigated present the number of bacteria investigated for antimicrobial resistance. If different numbers of isolates were tested for resistance to the single antimicrobials, the highest number of isolates tested is given in the table.

Methods applied

For *Salmonella* and *Escherichia coli* usually standard methods and breakpoints published by the National Committee for Clinical Laboratory Standards, USA (NCCLS)^{1,2} are used for testing (Table AB 1). For florfenicol, streptomycin and neomycin, no NCCLS standard is established, the breakpoints used are summarised in Table AB 2. Some countries follow mainly the NCCLS standard, but for some substances national standards are used (Table AB 3). France, Spain and the United Kingdom keep to national standards (Table AB 4). Results were requested as percentage resistant strains for a defined panel of antimicrobials: tetracycline (TET), chloramphenicol (CHL), florfenicol (FLR), ampicillin (AMP), 3rd generation cephalosporins (CE), ciprofloxacin (CIP) or enrofloxacin (ENR), nalidixic acid (NAL), trimethoprim/sulfonamide (SXT), streptomycin (STR), gentamicin (GEN), neomycin (NEO), kanamycin (KAN). Testing and reporting on trimethoprim (TMP) and sulfonamide (SU) was optional. With single exceptions all requested antimicrobial groups were tested by all countries with one or two substances.

Quality of the data

The data transmitted are combined in different grades, one part refer to single species another part is aggregated as animals or even animals and food. The agent *Salmonella* is broken down to *S. Enteritidis* or *S. Typhimurium* or combined to *Salmonella* spp.

In contrast to active monitoring programmes, the number of isolates from clinical investigations or other passive surveillance systems fluctuate in the years. Therefore the assessment of trends is limited. Another constricting factor for a trend analysis is the reporting of the data, not all countries report their results every year. Therefore the assessment in the chapters mainly refer to the presence or absence of resistance to the antimicrobial substances, regardless the quantity found resistant.

Results

Data were requested from the main animal species (cattle, pigs and poultry), products thereof and for the five major *Salmonella* serovars. The Member States mainly followed this guideline for animals and 10 Member States included at least information on poultry meat. Belgium restricted the information to food products and humans, Ireland reported only on human isolates and Greece investigated mainly poultry and poultry meat.

In 16 countries, at least data for *S. Typhimurium* were presented. Data for *S. Enteritidis* were given from 14 countries. 7 countries provided data from the five most common serovars in the country.

Data are presented in Table AB 5 for *Salmonella* in animals and food. Data are broken down for the main animal species and humans in Tables AB 6 to 9. Details on *S. Enteritidis*, *S. Typhimurium* separately and the other serovars together broken down by the main animal species are given in Tables AB 10 to 11. Details on the other serovars are given in Table AB 12. In case isolates are collected in a monitoring programme, this detail is given in the tables. No distinction is made by the breakpoints applied.

Quantitative data, that is the minimal inhibitory concentrations (MIC) measured by using dilution methods, are presented for each of the antimicrobials requested separately in Tables AB 13 to 25. These tables include information on the breakpoint applied in the individual country, the dilutions tested, the share of resistant isolates and the percentage of isolates showing the individual MIC-values. As most information was provided for all animals together only, detailed analysis by the source of origin was not made.

¹ Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated from Animals; Approved Standard [ISBN 1-56238-377-9] M31-A

² NCCLS. Performance Standards for Antimicrobial Susceptibility Testing: Eleventh Informational Supplement. NCCLS document M100-S11 [ISBN 1-56238-426-0]. NCCLS, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 2001.

Geographical differences

Norway, Sweden and Finland differ from the other European countries by a low prevalence level of *Salmonella*. Isolates from these countries are mainly susceptible to antimicrobial substances.

The Norwegian *Salmonella* Control Programmes document that Norwegian food production animals are virtually free from *Salmonella*. The investigation of these few isolates indicate that antimicrobial resistance is not widespread among *Salmonella* from Norwegian animals.

In Sweden, the overall situation of antimicrobial resistance in *Salmonella* is favourable. A total of 101 isolates are included in the material. Of these, 54 (53%) were from food-producing animals and the remainder from dogs, cats and wildlife including wild birds. The low level of resistance among *Salmonella enterica*, as well as in the subset *S. Typhimurium*, agrees with the results for previous years. Ninety-three percent of the isolates were susceptible to all tested antimicrobials. No multiresistant isolates of *S. Typhimurium* were demonstrated in year 2003. Among all isolates from food animals isolated from years 1997 – 2003 (n=272), only 7% were resistant to any of the antimicrobials tested and 2% were multiresistant.

In Finland the National Veterinary and Food Research Institute has followed antibiotic resistance of *Salmonella* isolates from foodstuffs since 1983. In 2003, *Salmonella* situation was very good and therefore only very few strains were isolated and tested for antibiotic resistance. All isolates (n=36) from animals and foodstuffs (n=11) were sensitive to all antimicrobials tested.

These three countries are omitted from the general statements on the resistance in the animal species and agents in the following chapters.

Animals

Results reported for *Salmonella* isolates from animals are presented in Table AB 5. There, information is included from all countries, which gave data on resistance testing of *Salmonella* isolates. In addition to the reported overall rates for *Salmonella*, summarising rates were calculated from the reported serovars. It has to be taken into account that for countries, where the information provided did not cover all *Salmonella* isolates or serovars, these tables do not necessarily reflect the whole resistance situation.

In general, resistance to tetracycline, ampicillin, sulfonamides, amphenicols and streptomycin seems to be common in *Salmonella* strains isolated in the European Union. Also resistance to streptomycin, sulfonamide and ampicillin was often detected. Most Member States reported resistance to nalidixic acid, which is an indicator of developing resistance to fluoroquinolones. However, quite large differences exist in the resistance rates and patterns between the Member States.

Food

The isolates from food have the same resistance pattern as the isolates from animals.

In Belgium, 178 strains isolated in the official zoonosis monitoring plan for meat and meat products were tested for their resistance against 12 antimicrobials. In general, the highest resistance was found against ampicillin (29%), tetracycline (25%), sulphonamides (23%), trimethoprim-sulfonamides (18%) and nalidixic acid (24%). Overall resistance remained at the same level since two years, except that resistance to nalidixic acid is increasing. All isolates investigated were susceptible to kanamycin, ciprofloxacin and ceftriaxone, the latter is a confirmation of the situation in 2002.

Cattle

Results reported for *Salmonella* isolates from cattle are presented in Table AB 6. 6 countries run a monitoring program in cattle in *Salmonella*. French data were provided by a passive surveillance system based on a network of laboratories. Strains were mainly isolated from

clinical cases and therefore, in many cases, recently exposed to an antibiotic treatment administered to the animal. Actually, these data are not issued from a monitoring programme on healthy animals.

In cattle all countries found resistance to tetracyclin and chloramphenicol. All countries with the exception of Italy and The Netherlands found resistance to ampicillin and nalidixic acid. Fewer countries found the isolates resistant to sulfonamides and streptomycin. Single countries found few isolates resistant to sulfonamide/trimethoprim, trimethoprim, neomycin and kanamycin. Resistance to cephalosporins was reported from England and Wales and Italy. Isolates resistant to gentamicin were only reported from Italy (3%) and fluoroquinolone resistance was only found in Sweden and Lithuania.

In England and Wales most *S. Dublin* isolates originate from cattle. Resistance to ampicillin, re-appeared in 2003. Resistance to furazolidone and neomycin, which had also not been detected for several years in *S. Dublin*, was observed for the first time in recent years in 2002 and again in 2003. In 2003, resistance to trimethoprim/sulphonamides in *S. Dublin* declined to 0,4%. Resistance to streptomycin increased, with 1,4% of cultures resistant. These fluctuations are probably related to clonal spread of particular isolates as a result of husbandry and animal movement factors, in addition to variation in the selective pressure exerted by antimicrobial usage. Most *S. Typhimurium* DT104 isolates recovered from cattle had the typical pentavalent resistance pattern AmCSSuT³ and were also resistant to cephalotin.

Beef

7 countries reported on *Salmonella* isolates from beef. In 4 countries all isolates tested were fully sensitive to all antimicrobials. In the other 3 countries the *Salmonella* isolates were resistant to tetracyclin, chloramphenicol, ampicillin, sulfonamides and streptomycin.

Pigs

Results reported for *Salmonella* isolates from pigs are presented in Table AB 7. A monitoring program for *Salmonella* in pigs is conducted in 8 countries. In all countries resistance to tetracyclin, chloramphenicol and ampicillin (not in Italy) was found. Not all countries reported resistance to nalidixic acid, sulfonamide/trimethoprim, trimethoprim, sulfonamides, streptomycin, gentamicin and neomycin. Only single countries found *Salmonella* resistant to kanamycin, cephalosporins and fluoroquinolone.

In Denmark, the substantial increase in consumption of tetracycline and penicillins in 2003 in pigs did not have any immediate effect on the occurrence of resistance in *S. Typhimurium* isolates from pigs. However, since 1999 resistance to tetracycline in *S. Typhimurium* isolates from pigs has increased steadily.

England and Wales, considering all definitive types of *S. Typhimurium*, there has also been a marked increase in resistance to sulphamethoxazole/trimethoprim from levels of around 16-37,5% in 1996-2003. Mainly isolates from pigs account for this rise.

Pork

With the exception of Finland, all isolates from *Salmonella* from pork were resistant to several antimicrobials. The pattern is similar to the pattern found in pigs. Only the resistance to gentamicin and neomycin was less frequently reported than in pig isolates.

In Belgium, pork isolates (n=78) (mainly *S. Typhimurium*, *S. Derby* and *S. Brandenburg*) showed a high resistance against tetracyclin (31%) and to a less extent to sulfonamides (18%), streptomycin (17%) and ampicillin (15%).

³ Ampicillin, chloramphenicol, streptomycin, sulfonamides and tetracyclin

Poultry

Results reported for *Salmonella* isolates from poultry are presented in Table AB 8. A monitoring program for *Salmonella* in poultry is conducted in 7 countries. *S. Enteritidis* is the dominating serovar in poultry, fewer isolates come from the serovar *S. Typhimurium*. The resistance rates are opposite, *S. Typhimurium* showed much higher resistance rates than *S. Enteritidis*. Resistance to tetracyclin and ampicillin is found in all countries in both serovars. Resistance to chloramphenicol is absent in *S. Enteritidis*, but present in all countries in *S. Typhimurium*. With the exception of England and Wales all countries found resistance to nalidixic acid in *S. Enteritidis* and 4 countries reported resistance to fluoroquinolone. Isolates from *S. Typhimurium* are mainly susceptible to nalidixic acid and only a single country reported resistant isolates to fluoroquinolone.

In England and Wales in 2003, 6,3 % of all isolates were resistant to furazolidone. The observed increase is considered to reflect increased surveillance of *Salmonella* isolates from ducks rather than a genuine increase in resistance to this antimicrobial, since *S. Indiana* is a frequent *Salmonella* isolate from ducks and is commonly resistant to furazolidone.

Poultry meat

The resistance pattern of *Salmonella* isolates from poultry meat is similar to the pattern of poultry.

In Belgium, the highest resistance was found in *Salmonellae* isolated from broilers and minced chicken (n=58) (predominant serotypes Virchow, Hadar, and Paratyphi B), ampicillin (43% and 52%), nalidixic acid (45% and 52%), sulfonamides (31% and 33%) and trimethoprim (33% and 30%). 28% of the *Salmonellae* isolated from broilers and 23% isolated from minced chicken were resistant to 5 antibiotics or more.

Humans

Results reported for human *Salmonella* isolates are presented in Table AB 9.

Information on human isolates is available from 4 countries. The overall picture for *Salmonella* spp. is a resistance of one third of the isolates to tetracyclin, ampicillin, sulfonamides and streptomycin. Up to one fifth is resistant to chloramphenicol, sulfonamide/trimethoprim, trimethoprim and nalidixic acid. 99% are sensitive to fluoroquinolones, cephalosporins and gentamicin. With the exception of Belgium, resistance to nalidixic acid occurred mainly in *S. Enteritidis*. Resistance for the other antimicrobials in *S. Enteritidis* is less than 4%. Higher resistance rates, with the exception of nalidixic acid, are found in *S. Typhimurium*. This serovar mainly contribute to the resistance pattern of *Salmonella* spp.

In Belgium, resistance was mainly found against tetracycline (31,3%), ampicillin (29,9%), nalidixic acid (29,5%), and to a lesser extent against streptomycin (20,6%), sulphonamides (17,2%), trimethoprim and sulfamethoxazole (11,6%). The highest antibiotic resistance levels were observed in *S. Hadar*. The 42 isolates were resistant to at least two antibiotics. Resistance to tetracycline, nalidixic acid, ampicillin and streptomycin reached values from 71,4 up to 90,5 %. Simultaneous resistance to these four antibiotics was observed in 57% of these isolates. However, isolates from this serotype remained fully sensitive to cefotaxime, chloramphenicol, and gentamicin. 29% of isolates from *S. Typhimurium* (n=314) were resistant to four or more antimicrobial agents. Eighteen percent of the isolates were shown resistant to ampicillin, chloramphenicol, streptomycin, sulfonamides and tetracycline (R-type AmCSSuT³ with or without additional resistances). 73% of these multi resistant strains were the definitive phage type (DT) 104. Multiresistance was also common in *S. Virchow* (n=44), the highest incidence of resistance was observed for nalidixic acid (86,4%).

In Denmark, susceptibility testing was performed in 412 (56%) *S. Enteritidis* isolates. Resistance was generally low, in domestically acquired isolates as well as in those acquired abroad. However, in domestically acquired isolates resistance to nalidixic acid increased

significantly from 4% in 2002 to 15% in 2003. In isolates from cases acquired from abroad nalidixic acid resistance was 24%, a percentage comparable to that in 2002.

In Denmark, almost all (>99%) of *S. Typhimurium* isolates were tested for antimicrobial susceptibility. The proportion of DT104 and related phage types (DT104b, DTU302) among the *S. Typhimurium* isolates was 27% in 2003. Resistance in *S. Typhimurium* isolates to trimethoprim, ampicillin, sulfonamides and aminoglycosides was significantly higher in cases where infection was acquired from abroad compared to those acquired in Denmark. Among *S. Typhimurium* isolates from cases with infection acquired in Denmark, a significant increase in resistance to tetracycline and streptomycin was observed in 2003. However, a significant decrease in resistance to trimethoprim occurred. In isolates from infections acquired abroad, no changes were observed in 2003.

S. Enteritidis

Data on antimicrobial resistance in *S. Enteritidis* are presented in Table AB 10.

S. Enteritidis has a very low resistance rate in isolates from cattle. The 4 countries investigating *S. Enteritidis* from pigs found them all susceptible. The isolates from poultry were mainly resistant to nalidixic acid. The resistance pattern in humans is similar to the resistance pattern found in poultry isolates.

Data on *S. Enteritidis* isolates from food were only reported from Denmark, however all isolates originated from meat imported to Denmark.

S. Typhimurium

Data on antimicrobial resistance in *S. Typhimurium* are given in Table AB 11.

S. Typhimurium mainly contributes to the overall situation as regards resistance in *Salmonella*. Resistance rates are high to tetracycline, chloramphenicol, ampicillin, sulfonamides and streptomycin, low resistance or susceptibility is reported for cephalosporins and the aminoglycosides gentamicin, neomycin and kanamycin. Poultry and isolates from pigs were fully susceptible to fluoroquinolone. In cattle 2 isolates from Luxembourg were found resistant to fluoroquinolone.

Resistance to cephalosporins in *S. Typhimurium* from cattle was reported in France and Italy, but not in the other 7 countries which investigated this group of antimicrobials.

In Belgium, from the 29 *S. Typhimurium* strains tested for their susceptibility, the overall resistance was high: 52% for tetracycline, 41% for ampicillin, 34% for sulfonamides, 31% for streptomycin and 21% for chloramphenicol, trimethoprim and the combination trimethoprim-sulfonamide. 31% of the strains were resistant to 5 antibiotics or more. No resistance was noticed against ceftriaxone, ciprofloxacin or nalidixic acid.

Other *Salmonella* serovars

Data for other serovars are given in Table AB 12. The occurrence and investigation of single serovars is restricted to single countries.

S. Dublin is mainly investigated in England and Wales, single isolates came from Latvia. *S. Dublin* has a resistance rate of 1% in cattle isolates, isolates from other animal species were susceptible to all antimicrobials tested.

S. Indiana was the single serovar with a single resistance exclusively to streptomycin. For the other serovars investigated, resistance to tetracycline, ampicillin, nalidixic acid and streptomycin is common.

Resistance to nalidixic acid is mainly absorbed by *S. Kottbus*, *S. Saintpaul*, *S. Paratyphi B* var. Java, *S. Hadar* and *S. Blockley* isolated from poultry. Additional resistance to fluoroquinolones is restricted to the serovars *S. Hadar* and *S. Saintpaul*.

The vast majority of animal species carrying *S. Virchow* are also resistant to nalidixic acid, few species acquired the additional resistance to fluoroquinolones.

Quantitative data on antimicrobial susceptibility testing

9 countries provided information on the quantitative distribution of the inhibition concentration of the isolates from *Salmonella* (Tables AB 13-25). Beyond the information resistant and sensible, already incorporated in the tables AB 5 to 12, additional information is available regarding breakpoints used and performance of the different countries. Susceptible isolates are mainly inhibited in their growth at a concentration 2 dilution steps lower than the concentration of the breakpoint. This results in a uniform distribution for all susceptible isolates from animals. In general isolates from food are more sensible, they are inhibited at lower concentrations of the antimicrobial. Resistance has different mechanism and resistant isolates are inhibited at different concentrations of the antimicrobial. Streptomycin is an exception. Susceptible isolates are inhibited at different concentrations of the antimicrobial. This might be an evidence of the difficulty to perform standardised antimicrobial susceptibility testing for streptomycin (Result of the quality assurance test CRL *Salmonella*).

12.2. *Campylobacter*

Source of information and methods applied

Data from *Campylobacter* were provided by 6 countries. Results were requested as percentage resistant strains for a defined panel of antimicrobials: tetracycline (TET), ampicillin (AMP), ciprofloxacin (CIP) or enrofloxacin (ENR), nalidixic acid (NAL) and gentamicin (GEN). Besides Ampicillin all countries investigated all substances. All countries providing data in 2003 investigated *Campylobacter* in the framework of monitoring programmes.

Besides Austria all countries used a dilution method for antimicrobial susceptibility testing (Table AB 26). The breakpoints used have a broad range, they differ from 1 to 5 dilution steps.

Quantitative data, that is the minimal inhibitory concentrations (MIC) measured by using dilution methods, are presented for each of the antimicrobials requested separately in Tables AB 31 to 39. These tables include information on the breakpoint applied in the individual country, the dilutions tested, the share of resistant isolates and the percentage of isolates showing the individual MIC-values.

Results

Animals

Resistance rates in the 3 northern countries, Denmark, Sweden and Norway, and the other reporting countries, Province of Styria (Austria), Spain and The Netherlands are different. The resistance pattern is similar, but the number of isolates resistant differs. In the northern countries the resistance rate does not exceed 8% in isolates from domestic animals or animal products and are susceptible to gentamicin and erythromycin. Exceptions are isolates from pigs, in Denmark 24% are resistant to erythromycin, in Sweden 18% are resistant to nalidixic acid and 16% to fluoroquinolone. An opposite picture is seen in Spain, isolates from pigs and poultry have resistance rates over 90% for tetracycline, nalidixic acid and fluoroquinolone and are resistant to erythromycin and gentamicin. In Styria and The Netherlands resistance to tetracycline, nalidixic acid and fluoroquinolone is high.

In Denmark low levels of antimicrobial resistance were observed in *C.jejuni* isolates from broilers and cattle. In *C.coli* isolates from pigs resistance to erythromycin (24%) and streptomycin (49%) was most frequently observed. The proportions of resistant isolates remained unchanged from 2002 to 2003 for all antimicrobials tested.

In Sweden all isolates from animals were susceptible to ampicillin, erythromycin and gentamicin, and only one isolate was resistant to tetracycline. The apparent absence of resistance to erythromycin indicates that the prevalence of resistance is very low, which is noteworthy as higher levels are often reported from many other countries.

Food

In Denmark resistance to tetracycline, nalidixic acid, streptomycin and ciprofloxacin was detected in isolates from food. The occurrence of resistance to tetracycline was significantly higher in isolates from imported broiler meat (42%) than in broiler meat of Danish origin (5%).

Cattle

Isolates from cattle were investigated in Denmark and Province of Styria (Austria). The isolates were fully susceptible to erythromycin and gentamicin, in Denmark in addition to tetracycline. Resistance to nalidixic acid and fluoroquinolone is common (Table AB 29).

Pigs

All countries found resistance to tetracycline, fluoroquinolone, and nalidixic acid and with the exception of Sweden to erythromycin (Table AB 29). In addition isolates from Spain and Province of Styria (Austria) were resistant to gentamicin.

In Sweden, resistance to enrofloxacin (16%) and nalidixic acid (18%) was more common than in reports from some other regions. This comparatively high prevalence is difficult to explain as the exposure of Swedish pigs to these antimicrobials is assumed to be low. Among the five isolates of *C. jejuni*, one was resistant to erythromycin, nalidixic acid and enrofloxacin.

Poultry

All countries found resistance to tetracyclin, fluoroquinolone and nalidixic acid. Isolates from Province of Styria (Austria) and Spain were additionally resistant to erythromycin and in Spain to gentamicin (Table AB 29).

In Norway the occurrence of antimicrobial resistance in *Campylobacter* spp. from Norwegian broilers is low. Noteworthy, the prevalence of fluoroquinolone resistance is particularly low.

Poultry meat

The resistance pattern found in poultry meat is similar to the resistance found in poultry.

Humans

The resistance pattern in human isolates is similar to that found in animals. Resistance to tetracyclin, nalidixic acid and fluoroquinolone are more frequently found than gentamicin and erythromycin (Table AB 29).

In Denmark in 2003, as in previous years, resistance to tetracycline, gentamicin, nalidixic acid and ciprofloxacin was higher in *C.jejuni* isolates from infections acquired abroad than from infections acquired in Denmark. Isolates of *C.jejuni* were generally susceptible to erythromycin.

Quantitative data on antimicrobial susceptibility testing

4 countries provided information on the quantitative distribution of the inhibition concentration of the isolates from *Campylobacter* (Table AB 31- 36). The performance of the antimicrobial susceptibility testing in *Campylobacter* is standardised by the NCCLS, but this standard is not practical. Therefore the laboratories in the Member States uses different methods.

The concentration of the antimicrobials inhibiting sensible isolates from *C. jejuni* and *C. coli* is not as uniform as in *Salmonella*. Susceptible isolates are mainly inhibited at a concentration of the antimicrobial 2 to 5 dilution steps lower than the breakpoint. An exception of the distribution of concentrations, inhibiting *C. coli*, are the antimicrobials ampicillin and erythromycin. Isolates from this agent are inhibited at any concentration tested, in contrast to the other antimicrobials.

12.3. Escherichia coli

Source of information and methods applied

9 countries provided information about *Escherichia coli* (*E.coli*) indicator bacteria. 6 countries investigated the food animals in a monitoring approach, 3 countries investigated the antimicrobial resistance in *Escherichia coli* for other reasons.

Again as mentioned for *Salmonella* the three northern countries, Norway, Sweden and Finland differ from the other countries. At least 90% of the isolates are sensitive to all antimicrobials tested. An opposite development is seen in Spain and Greece, high resistance rates occurred.

Results

Animals

Isolates from monitoring programmes are resistant to tetracyclin, ampicillin, sulfonamides and streptomycin. Less or no isolates are resistant to chloramphenicol, nalidixic acid, cephalosporins, gentamicin, neomycin and kanamycin.

In Denmark in isolates from indicator *E.coli* from broilers and cattle only minor changes were observed in 2003, except for a significant increase in resistance to tetracycline among isolates from broilers (from 5% in 2002 to 14% in 2003). In isolates from broilers resistance to sulfonamide (20%) and ampicillin (15%) remains most frequently observed. In poultry, the consumption of these antimicrobials, and the consumption of tetracycline was reduced substantially in 2003. The level of resistance in isolates from cattle was generally low and did not exceed 4% for any of the antimicrobials tested.

Cattle and beef

In countries running a monitoring programme, resistance in cattle and beef is low. Higher resistance rates are seen in Greece, Latvia and in beef in Spain.

In Finland a low occurrence of resistance among *E.coli* from faecal samples of cattle was detected. Resistance to streptomycin was most prevalent, though only 5 %. Resistance to sulphamethoxazole was 2 %, and to ampicillin and nalidixic acid 1 %. Resistance to chloramphenicol, tetracycline and trimethoprim was < 1 %, and no resistance was detected to ceftiofur, enrofloxacin, florfenicol, gentamicin or neomycin.

In Norway a moderate prevalence of resistance in faecal indicator *E.coli* from Norwegian cattle and beef was observed. Those resistances that were most commonly encountered are to antimicrobials that have been or still are typically used therapeutically such as streptomycin, sulfonamides, tetracycline and ampicillin. Quinolone resistance was not detected, which is a reflection of a very low use of such antimicrobials in food producing animals.

Pigs

In pigs the resistance pattern among the countries is more uniform. Higher resistance rates are seen for tetracyclin, trimethoprim, sulfonamides and streptomycin, less isolates are resistant to ampicillin and chloramphenicol and 0-2% resistance to nalidixic acid and fluoroquinolone is found. In Spain a higher percentage, 14% of the isolates, were resistant to nalidixic acid.

In Sweden the monitoring includes 303 isolates of *E.coli* from pigs. Isolates were obtained from 83% of 367 samples cultured, a similar isolation frequency as in SVARM. The proportions of resistance are low and have been stable over the three years studied. In year 2003, the majority of isolates (78%) were sensitive to all 14 antimicrobials tested but 67 isolates were resistant to at least one substance. Resistance to tetracycline, sulphonamides or streptomycin was the most common traits (9-12%). Ampicillin or trimethoprim resistance was less common (3-4%) and only occasional isolates were resistant to amoxicillin/clavulanic acid, chloramphenicol, enrofloxacin, nalidixic acid or neomycin. No isolate was resistant to florfenicol, apramycin, ceftiofur or gentamicin. Thirty-four isolates (11%) were resistant to more than one antimicrobial and 15 isolates (5%) were multiresistant, i.e. were resistant to three or more of the antimicrobials tested.

In Denmark in contrast to previous years, resistance to several antimicrobials in indicator *E.coli* isolates from pigs increased significantly in 2003. Resistance to ampicillin, sulfonamide, trimethoprim, spectinomycin and streptomycin increased from 2002 to 2003, and were the most frequently observed resistance in indicator *E.coli* isolates from pigs in 2003. Resistance to chloramphenicol increased from 2001 to 2003. These observations coincided with increased consumption of penicillins, sulfonamides / trimethoprim, tiamulin and amphenicols in pigs in 2003. The substantial increase in consumption of tetracycline in pigs in 2003 was not reflected in the occurrence of resistance to tetracycline among indicator *E.coli* in pigs in 2003.

Pork

The resistance pattern in pork is similar to the pattern found in pigs

Poultry

The resistance pattern from isolates from poultry is similar to the other food animals. In addition nalidixic acid is higher, fluoroquinolone resistance is present and also resistance to aminoglycosides other than streptomycin is higher than in pigs and poultry.

Poultry meat

The resistance pattern in poultry meat is similar to the pattern found in poultry.

Humans

Denmark is the only country investigating healthy humans. Like in 2002, resistance to sulfonamide, ampicillin, tetracycline and streptomycin were most common. None of the isolates were resistant to gentamicin. No significant changes in resistance were observed between 2002 and 2003. Ciprofloxacin/nalidixic acid resistance was observed in one percent of the isolates, but none exceeded the NCCLS breakpoint for ciprofloxacin. In all indicator *E.coli* isolates a breakpoint of 0.125 µg/ml was used.

Quantitative data on antimicrobial susceptibility testing

5 countries provided information on the quantitative distribution of the inhibition concentration of the isolates from *Escherichia coli* (Tables AB 43 -51). The distribution of the inhibition concentrations of *Escherichia coli* isolates is similar to the distribution of *Salmonella* isolates. Isolates sensible to the antimicrobial tested are mainly inhibited at a concentration 2 to 3 dilution steps lower than the concentration used at the breakpoint. Countries differ in the range tested. The lowest concentration tested for sulfonamides and trimethoprim in Denmark is two fold higher than the concentration, where sensible isolates are inhibited in Norway, Sweden, Finland.

Table AB 1. Test methods used for antibiotic resistance testing of *Salmonella* spp. 2003

Standard used for testing	Test method	Country	used for	additional standards used	Is the testing procedure subject of national control	further remarks	
<i>Salmonella</i> spp.							
NCCLS	Agar diffusion	Austria	⁰ Animals and food		yes	NRL-S, AGES	
		Belgium	⁰ Animals and food				
		Cyprus	⁰ Animals and food			no	
		Greece	² Poultry			yes	Laboratory 2
		Greece	¹ Animals and food			yes	Laboratory 1
		Italy	¹ Animals and food			yes	
		Latvia	⁰ Animals and food			yes	
		Portugal	⁰ Animals and food			yes	
		Slovenia	⁰ Animals and food			yes	
		Spain	² Animals and food				
		Luxembourg	⁰ Animals and food			no	
		Spain	¹ Animals		VAV	yes	UCM
		NCCLS	Broth dilution	Denmark	⁰ Animals and food	Danmap 2003	
Finland	⁰ Animals and food				yes		
Germany	⁰ Animals and food			Danmap 2000		yes	
The Netherlands	⁰ Animals and food				yes		
France	Animals and food				yes		
CASFM	Agar diffusion	France	Animals and food		yes		
		Norway	⁰ Animals and food		yes		
Microbiological Breakpoints	Broth dilution	Norway	⁰ Animals and food		yes		

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 1. Test methods used for antibiotic resistance testing of *Salmonella* spp. 2003

Standard used for testing	Test method	Country	used for	additional standards used	Is the testing procedure subject of a national control	further remarks
Microbiological Breakpoints	Broth dilution	Sweden	⁰ Animals and food		yes	
OMS	Agar diffusion	Spain	³ Animals and food		yes	
VLA	Agar diffusion	England and Wales	⁰ Animals and food		yes	BSAC/ Historical UK veterinary

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 2. Breakpoints used for antibiotic resistance testing of *Salmonella* spp. for those antimicrobials where no NCCLS breakpoint is fixed 2003

Standard used	Country	Breakpoints (µg/ml)		Disk content (µg)	Zone diameter (mm)			
		susceptible <=	resistant >		susceptible >=	intermediate	resistant <=	
Salmonella spp.								
Florfenicol	Germany	0	8	16				
	Denmark	0		16				
	Spain	1	16	16				
	Finland	0	16	16				
	Slovenia	0			30	20	17-19	16
	Sweden	0	16	16				
	Norway	0		16				
3rd gen. Cephalo	The Netherlands	0	1	1				
	Portugal	0			30	21	18-20	17
	Cyprus	0			30	21	14-20	13
	Spain	3			30	18	18-12	12
Streptomycin	Germany	0	8	16				
	Denmark	0		16				
	Finland	0	32	32				
	The Netherlands	0	16	16				
	France				10	15		13
	Sweden	0	32	32				
	Norway	0		32				
England and Wales	0			25	13		13	
Neomycin	Belgium	0			30	18	15-17	14
	Germany	0	4	8				
	Denmark	0		8				
	Spain	1	8	8				
	Finland	0	8	8				
	Greece	1			30	17	13-16	12
	Italy	1			30	17	13-16	12
	The Netherlands	0	16	16				
	Portugal	0			30	15	13-14	12
	Latvia	0			30	15	13-14	12
	Sweden	0	8	8				
	Norway	0		4				
England and Wales	0			10	13		13	

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 3. Breakpoints used for antibiotic resistance testing of Salmonella spp. - deviations from NCCLS-Standards 2003

Antimicrobial	Country	Breakpoints (µg/ml)		Disk content (µg)	Zone diameter (mm)			other Standard
		susceptible <=	resistant >		susceptible >=	intermediate	resistant <=	
Salmonella spp.								
Ampicillin	Spain	²		10	15	13-14	11	
Cephalotin	Denmark	⁰						Danmap 2003
Cefotaxim	Spain	¹	0,5	4				VAV
Ceftazidime	Spain	¹			22		14	VAV
3rd gen. Cephalosporin	The Netherlands	⁰	1	1				
	Portugal	⁰			30	21	18-20	17
	Cyprus	⁰			30	21	14-20	13
Ceftriaxone	Latvia	⁰			30	21	14-20	13
Ciprofloxacin	Germany	⁰	0,25	2				Danmap 2000
	Denmark	⁰		0,06				Danmap 2003
Enrofloxacin	Italy	¹			5	22	18-21	17
	Portugal	⁰			5	23	17-20	16
	Slovenia	⁰			5	20	17-19	16
Flumequine	Greece	²			30	25	22-24	21
Trimethoprim	Spain	²			5	20	17-19	16
Kanamycin	Portugal	⁰			30	15	13-14	12
Apramycin	Denmark	⁰		8				Danmap 2003
Spectinomycin	Denmark	⁰		64				Danmap 2003
Colistin	Denmark	⁰		8				Danmap 2003

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 4. Breakpoints used for antibiotic resistance testing of Salmonella with agar diffusion other than NCCLS 2003

Antimicrobial	Standard used	Country	Disk content (µg)	Zone diameter (mm)	
				susceptible >=	resistant <=
Salmonella spp.					
Tetracyclin	CASFM	France	30	19	17
	OMS	Spain	30 UI	19	17
	VLA	England and Wales	10	13	13
Chloramphenicol	CASFM	France	30	23	19
	OMS	Spain	30	23	19
	VLA	England and Wales	10	13	13
Ampicillin	CASFM	France	10	19	14
	OMS	Spain	10	19	14
	VLA	England and Wales	10	13	13
Ceftazidime	CASFM	France	30	21	15
Cephalotin	CASFM	France	30	18	12
Cefotaxim	CASFM	France	30	21	15
3rd gen. Cephalosporin	OMS	Spain	30	18	12
	VLA	England and Wales	30	13	13
Cefoperazone	VLA	England and Wales	30	13	13
Ciprofloxacin	OMS	Spain	5	22	19
Enrofloxacin	CASFM	France	5	22	17
Nalidixic acid	CASFM	France	30	20	15
	VLA	England and Wales	30	13	13
Trimethoprim/Sulfonamide	VLA	England and Wales	25	13	13
Sulfonamide	VLA	England and Wales	300	13	13
	CASFM	France	10	15	13
Streptomycin	VLA	England and Wales	25	13	13
	CASFM	France	10	16	14
Gentamycin	OMS	Spain	15	16	14
	VLA	England and Wales	10	13	13
	VLA	England and Wales	10	13	13
Neomycin	VLA	England and Wales	10	13	13
Kanamycin	CASFM	France	30	17	15

Abbreviations

DANMAP, Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark

NCCLS, Performance Standards for Antimicrobial Susceptibility Testing

OMS, Organisation Mondiale de la Sante

VLA, Veterinary Laboratories Agency

Table AB 5. Antibiotic resistance testing of Salmonella spp. in animals and food - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR	
Animals																										
Salmonella	NO	A	918	7	3	8	6	0,0	4	9						0,0					7	1		0		
Salmonella#	NO	A	621	3	1	7	1	0,0	3	5						0,0					2	0		0		
Salmonella	-	B	11	0	0	9	9	0,0	0	0						0,0					0	0		0		
Salmonella	NO	D	1331	44	22	19	44	13	0,8	10	11	53				0,2					51	4	5	6		
Salmonella#	NO	D	852	54	33	30	59	9	0,8	11	11	64				0,3					61	5	7	8		
Salmonella#	YES	DK	602	35	9	5	19	1	0,3	8	35		0,0			0,0					33	2		7		
Salmonella	YES	E	148	64	21	3	29	17	0,0	17	42			0,6	0,6						29	6	3	3		
Salmonella#	YES	E	84	67	26	5	36	24	0,0	7	35			1,2	1,2						25	4	1	1		
Salmonella	YES	FIN	36	0	0	0	0	0,0	0	0						0,0					0	0	0	0		
Salmonella#	YES	FIN	27	0	0	0	0	0,0	0	0						0,0					0	0	0	0		
Salmonella	NO	F	1409	29	7	16	11	0,1	9	15		1,3	0,1	0,0							38	0		1		
Salmonella#	NO	F	504	32	10	19	11	0,2	8	18		0,0	0,0	0,0							46	0	0	2		
Salmonella#	-	F	88	31	0	28	73	0,0	5	5		3,4	0,0	0,0							32	0		0		

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 5. Antibiotic resistance testing of Salmonella spp. in animals and food - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR
Salmonella	NO	EL	68	41	21	5	33	0,0	4	5	6										38	0	60	25	
Salmonella#	NO	EL	56	36	17	13	27	3,7	9	0	2										4	2	54	16	
Salmonella	-	I	1624	35	9	36	23	0,9	5	48	48	6,4	0,1								32	1	10	10	
Salmonella#	-	I	616	37	15	50	35	4,3	3	48	48	13,3	0,3								39	0	4	5	
Salmonella	-	L	4	50	0			0,0	0	0	0	0,0									0	0	0	0	
Salmonella	YES	L	4	0	50			0,0	0	0	50	0,0									100	0	0	0	
Salmonella#	YES	L	10	40	40	50	40	20,0	0	60	60	0,0									100	0	0	0	
Salmonella	NO	NL	24	29	33	21	21	0	0,0	5	40	0,0									0	0	0	0	
Salmonella	YES	NL	581	26	5	3	28	18	0,0	32	20	1,2									2	2	1	1	
Salmonella#	YES	NL	296	30	8	6	39	20	0,0	46	26	0,7									1	1	0	0	
Salmonella#	NO	NL	10	60	50	50	50	0	0,0	14	10	0,0									0	0	0	0	
Salmonella#	NO	P	3	33	33	100	0	0,0	33			0,0									33	0	0	0	
Salmonella#	-	P	28	79	7	29	43	7,1	21			7,7	31,0	0,0			0,0				100	14	21	21	
Salmonella	YES	S	101	1	0	0	2	2,0	0	2	2						0,0				2	0	0	0	
Salmonella#	YES	S	101	0	0	0	1	1,0	0	2	2						0,0				2	0	0	0	

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 5. Antibiotic resistance testing of Salmonella spp. in animals and food - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR
Salmonella#	YES	N	5	0	0	0	0	0,0	0	0	0	0	0	0	0	0,0	0,0	0	0	0	0	0	0	0	0
Salmonella#	NO	N	9	11	0	0	11	0	0,0	11	11	11	11	11	11	0,0	0,0	0	0	0	11	11	11	11	11
Salmonella	-	UK(E+W)	1074	30	5	6	2	7	7	18	18	18	18	18	18	0,0	0,0	0	0	0	23	23	17	17	1
Salmonella	YES	UK(E+W)	3649	19	13	14	4	16	59	25	25	25	25	25	25	0,0	4,7	0,0	4,7	0,0	14	14	1	2	0
Salmonella#	YES	UK(E+W)	1483	28	22	26	6	15	15	27	27	27	27	27	27	0,2	9,1	0,2	9,1	0,2	23	23	1	3	3
Salmonella#	-	UK(E+W)	5827	26	15	17	5	16	16	27	27	27	27	27	27	0,0	0,0	0,0	0,0	0,0	19	19	5	5	1
Salmonella	NO	LV	4	0	0	0	0	0,0	100	100	100	100	100	100	100	0,0	0,0	0,0	0,0	0,0	0	0	0	25	0
Salmonella	YES	LV	2	0	0	50	0	0,0	100	100	100	100	100	100	100	0,0	0,0	0,0	0,0	0,0	100	100	0	50	0
Salmonella#	YES	LV	3	0	0	0	0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmonella#	NO	LV	1	0	100	0	0	0,0	0	0	0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	100	100	0	0	0
Salmonella	-	LT	10	10	10	10	0	30,0	50	50	50	50	50	50	50	20	20	20	20	20	20	20	10	10	30
Salmonella#	NO	LT	2	0	0	0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salmonella	NO	SI	74	12	3	1	9	16	1,4	1	1	7	7	7	7	0,0	0,0	0,0	0,0	0,0	22	22	0	18	18
Salmonella#	NO	SI	89	20	1	1	9	16	1,4	1	3	7	7	7	7	0,0	0,0	0,0	0,0	0,0	22	22	0	18	18

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 5. Antibiotic resistance testing of Salmonella spp. in animals and food - Percentage of resistant isolates 2003

Monitoring		Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR	
Food																											
Salmonella	NO	A	455	22	6	16	26	0,0	6	19							0,0					24	1			6	
Salmonella	-	B	167	26	7	30	25	0,0	19	23	25										2,4	14				0	
Salmonella	NO	D	2056	26	13	12	25	8	0,2	9	10	29					0,0					27	0	1		2	
Salmonella#	NO	D	569	35	21	20	32	5	0,2	8	8	36					0,0					31	0	1		1	
Salmonella#	YES	DK	9	44	0	0	44	0	0,0	0	0	0					0,0					0	0	0		0	
Salmonella	NO	E	111	38	0	17	43	1,9	0								0,0					0	0			4	
Salmonella	YES	E	5	100	0	0	0	0,0	0								0,0					0	0			0	
Salmonella	NO	FIN	2	0	0	0	0	0,0	0	0	0	0					0,0					0	0	0		0	
Salmonella	YES	FIN	3	0	0	0	0	0,0	0	0	0	0					0,0					0	0	0		0	
Salmonella	-	FIN	6	0	0	0	0	0,0	0	0	0	0					0,0					0	0	0		0	
Salmonella	NO	F	324	49	11	18	10	0,6	15	37			1,2	0,3	0,0							54	1			2	
Salmonella	NO	EL	37	11	19	0	8	0,0	5	5	5											22	0			16	
Salmonella	-	I	1740	48	10	36	20	1,0	10	52			3,8	0,1								38	1	10		11	

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefitior (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 5. Antibiotic resistance testing of Salmonella spp. in animals and food - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR
Salmonella	YES	L	10	100	20	80	80	0,0	20	80	80	0,0	0,0								80	0	20		
Salmonella#	YES	NL	171	23	3	2	43	29	0,0	40	51	1,8										1	0		
Salmonella	NO	UK	17	6	0	6	0	0,0		6	6										6	0	0		
Salmonella	NO	SI	67	10	10	10	27	4	0,0	0	10			0,0							10	0	0		

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 6. Antibiotic resistance testing of Salmonella spp. in cattle and beef - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR
Salmonella	NO	A	12	8	8	8	0	0,0	8	8	8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	8	0	0	0	0
Salmonella#	NO	A	2	50	50	50	0	0,0	0	0	50	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	50	0	0	0	0
Salmonella	NO	D	362	46	32	30	45	3	0,0	3	3	51	0,3	0,3	0,4	0,4	0,3	0,3	0,3	0,3	52	0	1	1	1
Salmonella#	NO	D	269	56	41	40	55	3	0,0	3	3	62	0,4	0,4	0,4	0,4	0,4	0,4	0,4	0,4	61	0	1	1	1
Salmonella#	YES	DK	28	39	7	7	25	4	0,0	0	39	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	36	0	4	4	4
Salmonella	YES	FIN	10	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0
Salmonella#	YES	FIN	8	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0
Salmonella	NO	F	199	17	13	12	1	0,0	1	22	22	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	30	0	0	0	0
Salmonella#	NO	F	65	37	34	35	2	0,0	0	43	43	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	58	0	0	0	0
Salmonella	-	I	62	32	35	35	3	0,0	6	52	52	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	39	3	0	0	0
Salmonella#	-	I	28	64	64	71	7	0,0	0	64	64	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	71	0	0	0	0
Salmonella	YES	L	4	0	50	0	0	0,0	0	50	50	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	100	0	0	0	0
Salmonella#	YES	L	6	33	33	50	33	33,3	0	67	67	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	100	0	0	0	0
Salmonella	NO	NL	24	29	33	21	21	0	0,0	5	4	40	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0
Salmonella#	NO	NL	10	60	50	50	50	0	0,0	14	10	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0
Salmonella#	NO	P	1	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftriaxone (CRO), Cefoperazone (CFP), Ceftiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 6. Antibiotic resistance testing of Salmonella spp. in cattle and beef - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Salmonella	YES	S	8	13	0	0	0	25	25,0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0		
Salmonella#	YES	S	8	0	0	0	0	13	12,5	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0		
Salmonella#	YES	N	2	0	0	0	0	0	0,0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0		
Salmonella	YES	UK(E+W)	1248	15	13	14	2	6	6	15	15	0,0	8,0	0,0	0,0	8,0	0,0	8,0	0,0	8,0	13	0	0	0	0		
Salmonella#	YES	UK(E+W)	1089	15	12	14	3	6	6	14	14	0,0	7,1	0,0	0,0	7,1	0,0	7,1	0,0	7,1	12	0	0	1	1		
Salmonella#	NO	LT	1			0	0	0,0																			
Beef																											
Salmonella	NO	A	4	0	0	0	0	0,0	0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0		
Salmonella	-	B	4	0	0	0	0	0,0	0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0		
Salmonella	-	FIN	6	0	0	0	0	0,0	0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0		
Salmonella	NO	F	76	24	3	3	3	0,0	5	16	16	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	37	0	0	0	0		
Salmonella	-	I	70	60	29	34	23	0,0	17	51	51	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	63	3	14	14	14		
Salmonella	YES	L	8	100	25	100	0,0	0	0	75	75	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	75	0	0	0	0		
Salmonella#	YES	NL	13	23	15	8	15	0	0,0	15	15	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0		
Salmonella	NO	SI	1	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0		

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftriaxone (CRO), Cefoperazone (CFP), Ceftiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 7. Antibiotic resistance testing of Salmonella spp. in pigs and pork - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR
Salmonella	NO	A	45	40	7	27	13	0,0	16	56						0,0					40	0	0	0	0
Salmonella#	NO	A	2	50	50	50	0	0,0	0	50						0,0					50	0	0	0	0
Salmonella	NO	D	425	72	34	31	69	2	0,0	20	77					0,2					71	2	10	10	10
Salmonella#	NO	D	341	77	41	38	75	1	0,0	22	81					0,3					75	3	11	11	11
Salmonella#	YES	DK	547	36	9	5	19	0	0,0	9	36		0,0			0,0					34	2	2	8	
Salmonella	YES	E	118	79	26	3	36	3	0,0	22	53			0,8	0,8						35	6	3	3	3
Salmonella#	YES	E	63	89	35	6	48	1	0,0	9	46			1,6	1,6						34	5	1	1	1
Salmonella	YES	FIN	13	0	0	0	0	0,0	0	0	0					0,0					0	0	0	0	0
Salmonella#	YES	FIN	11	0	0	0	0	0,0	0	0	0					0,0					0	0	0	0	0
Salmonella	NO	F	28	79	14	14	0	0,0	18	50			0,0	0,0	0,0						54	4	0	0	0
Salmonella#	NO	F	7	86	29	43	0	0,0	14	57			0,0	0,0	0,0						57	0	0	0	0
Salmonella	-	I	166	82	16	60	10	0,6	25	75			3,6	0,0							54	7	10	11	11
Salmonella#	-	I	44	82	14	82	9	0,0	19	77			0,0	0,0							59	0	0	5	5
Salmonella	-	L	2	100	0			0,0	0	0	0		0,0								0	0	0	0	0
Salmonella	YES	NL	127	50	11	7	24	3	0,0	25	15		0,0									2	2	2	2
Salmonella#	YES	NL	64	63	17	14	31	0	0,0	23	22		0,0									0	0	0	0
Salmonella#	NO	P	1	0	0	0	0	0,0	0	0	0		0,0								0	0	0	0	0

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 7. Antibiotic resistance testing of Salmonella spp. in pigs and pork - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR
Salmonella	YES	S	38	0	0	0	0	0,0	0	0	0	0	0	0	0	0,0					0	0	0	0	0
Salmonella#	YES	S	38	0	0	0	0	0,0	0	0	0	0	0	0	0	0,0					0	0	0	0	0
Salmonella#	YES	N	2	0	0	0	0	0,0	0	0	0	0	0	0	0	0,0					0	0	0	0	0
Salmonella	YES	UK(E+W)	297	78	48	58	8	57	59	80	80	0,0	8,0	0,0	0,0	8,0					55	6	11		
Salmonella#	YES	UK(E+W)	210	88	65	79	12	65	88	88	88	0,0	11,5	0,0	11,5						71	9	15		
Salmonella	YES	LV	1	0	0	100	0	0,0	0,0	0,0	0,0	0,0									100	0	0	0	0
Salmonella#	NO	LV	1	0	0	100	0	0,0	0,0	0,0	0,0	0,0									0,0	100	0	0	0
Salmonella	-	LT	10	10	10	10	0	30,0	50												20	20	10	30	

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 7. Antibiotic resistance testing of Salmonella spp. in pigs and pork - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFF	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Pork																											
Salmonella	NO	A	8	38	13	13	0	0,0	0	63	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	38	0	0	0	0	0	0
Salmonella	-	B	78	31	8	15	1	0,0	12	14	18	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	17	0	0	0	0	0
Salmonella#	YES	DK	9	44	0	44	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0
Salmonella	YES	FIN	2	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0
Salmonella	NO	F	166	68	16	23	5	0,6	21	57	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	70	2	2	2	2	2	2
Salmonella	-	I	722	56	13	33	7	0,0	12	55	0,8	0,3	0,8	0,3	0,8	0,3	0,8	0,3	0,8	0,3	42	2	7	8	8	8	8
Salmonella	YES	L	2	100	0	0	0,0	100	100	100	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	100	0	100	100	100	100	100
Salmonella#	YES	NL	15	27	7	7	13	0	20	20	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0
Pork imported																											
Salmonella#	-	DK	42	93	26	24	60	7	14	64	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	60	0	0	0	0	0	0

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 8. Antibiotic resistance testing of Salmonella spp. in poultry and poultry meat - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFF	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Poultry																											
Salmonella	NO	A	861	5	2	7	6	0,0	4	6						0,0					5	1	0				
Salmonella#	NO	A	617	3	1	7	1	0,0	3	4						0,0					2	0	0				
Salmonella	-	B	11	0	0	9	9	0,0	0	0											0,0	0	0				
Salmonella	NO	D	544	21	5	3	23	1,8	8	10	36					0,2					35	9	3	6			
Salmonella#	NO	D	242	19	11	7	40	2,9	5	5	43					0,4					41	15	6	10			
Salmonella#	YES	DK	27	15	4	4	19	7,3	4	15			0,0			0,0					11	0	0				
Salmonella	YES	E	30	3	0	0	3	73	0,0	0	0			0,0	0,0						3	3	0	0			
Salmonella#	YES	E	21	0	0	0	0	91	0,0	0	0			0,0	0,0						0	0	0	0			
Salmonella	YES	FIN	13	0	0	0	0	0,0	0	0						0,0					0	0	0	0			
Salmonella#	YES	FIN	8	0	0	0	0	0,0	0	0						0,0					0	0	0	0			
Salmonella	NO	F	1182	30	6	17	13	0,2	10	13			1,6	0,2	0,0						39	0	0	1			
Salmonella#	NO	F	283	30	8	19	18	0,3	6	14			0,0	0,0	0,0						34	0	0	1			
Salmonella	NO	EL	65	43	21	3	33	0,0	5	5	6										38	0	100	25			
Salmonella#	NO	EL	53	32	17	12	27	3,9	10	0	2										2	0	63	16			
Salmonella	-	I	774	26	5	40	34	0,6	1	49			8,5	0,3							23	0	12	13			
Salmonella#	-	I	284	15	11	57	55	1,4	0	44			19,7	0,7							25	0	4	5			
Salmonella	-	L	2	0	0			0,0	0	0			0,0								0	0	0	0			

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 8. Antibiotic resistance testing of Salmonella spp. in poultry and poultry meat - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFF	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR
Salmonella	YES	NL	454	20	4	1	29	22	0,0	34	40	22	1,5									3	0		
Salmonella#	YES	NL	232	22	5	3	41	25	0,0	52	66	26	0,8									2	0		
Salmonella#	-	P	28	79	7	29	43	7,1	21	7,7	31,0	0,0									100	14	21	21	
Salmonella	YES	S	8	0	0	0	0	0,0	0	13											13	0	0		
Salmonella#	YES	S	8	0	0	0	0	0,0	0	13											13	0	0		
Salmonella#	NO	N	2	0	0	0	0	0,0	0	0											0	0	0		
Salmonella#	YES	N	1	0	0	0	0	0,0	0	0											0	0	0		
Salmonella	YES	UK(E+W)	1830	13	8	8	5	18	26					0,0	2,4						9	0	2		0
Salmonella	-	UK(E+W)	799	32	1	1	0	5	16												23	23			0
Salmonella#	YES	UK(E+W)	122	49	43	52	22	10	50					0,0	25,6						49	0	1		
Salmonella	NO	LV	4	0	0	0	0	0,0	100												0,0	0	0	25	0
Salmonella#	YES	LV	3	0	0	0	0	0,0													0	0	0	0	0
Salmonella	NO	SI	55	15	4	2	11	16	0,0	2	2	7		0,0							20	0	0		24
Salmonella#	NO	SI	58	26	2	2	12	16	0,0	2	3	9		0,0							21	0	0		22

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 8. Antibiotic resistance testing of Salmonella spp. in poultry and poultry meat - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFF	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Poultry meat																											
Salmonella	NO	A	443	22	6	16	27	0,0	7	18						0,0					24	1			6		
Salmonella	-	B	85	23	6	46	47	0,0	27	32											4,7	12			0		
Salmonella	YES	E	5	100	0	0	0,0	0,0	0							0,0							0				
Salmonella	NO	E	72	36	0	26	49	3,0								0,0						0	1				
Salmonella	YES	FIN	1	0	0	0	0,0	0,0	0	0						0,0						0	0	0	0		
Salmonella	NO	FIN	1	0	0	0	0,0	0,0	0	0						0,0						0	0	0	0		
Salmonella	NO	F	82	37	9	23	28	1,2	12	17		4,9	1,2	0,0							39	1			4		
Salmonella	NO	EL	37	11	19	0	8	0,0	5	5											22	0			16		
Salmonella	-	I	552	33	4	37	35	2,7	5	48		6,9	0,0								26	0	12		13		
Salmonella#	YES	NL	143	23	1	1	49	34	0,0	45	57	2,1										1	0				
Salmonella	NO	SI	63	11	11	11	29	5	0,0	0	11		0,0								11	0			0		
Poultry meat imported																											
Salmonella#	-	DK	35	3	0	3	49		0	6						0,0					14	6			0		

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 9. Antibiotic resistance testing of Salmonella spp. in humans - Percentage of resistant isolates 2003

Monitoring		Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN		
Humans																											
Salmonella#	-	B	1046	37	12	22	16	0,6	11	11	29			1,1								28	1			2	
Salmonella#	-	DK	718	28	7	10	22	8		2	28			0,0								27	1				
Salmonella#	-	IRL	340	33	23	36	21	0,0		9	34											28	1			0	
Salmonella	YES	NL	1337	21	8	6	17	12	0,1	6	6	23	0,3										1			1	
Salmonella#	YES	NL	955	23	10	8	20	10	0,0	5	5	20	0,3										1			1	

Note: The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ)
Sulfonamide/Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Cefazidime (CAZ), Cefoperazone (CFP), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN)

Table AB 10. Antibiotic resistance testing of Salmonella Enteritidis - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR	
S. Enteritidis																										
Cattle																										
	NO	A	1	0	0	0	0	0,0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
	NO	D	46	0	2	0	2	0,0	0	0	2	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	2	2	0	0
	YES	FIN	1	0	0	0	0	0,0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
	NO	F	13	0	0	0	0	0,0	0	0	8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	8	0	0	0	0	0
	NO	P	1	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
	YES	UK(E+W)	13	8	0	8	31	0	0	15	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
Pigs																										
	NO	A	1	0	0	0	0	0,0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
	NO	D	17	0	0	0	0	0,0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
	YES	S	1	0	0	0	0	0,0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
	YES	UK(E+W)	7	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixime (CXM), Cefuroxime (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 10. Antibiotic resistance testing of Salmonella Enteritidis - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR								
Poultry																																	
NO	A	540	1	0	4	1	0,0	1	2	0,0	0,0	0,0	0,0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
NO	D	69	1	0	4	16	0,0	1	1	0,0	0,0	0,0	0,0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
YES	DK	14	0	0	0	14	14,0	0	0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
YES	E	21	0	0	0	91	0,0	0	0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
NO	F	107	8	0	4	6	0,9	2	3	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
NO	EL	43	16	0	12	18	4,7	7	0	3	0,0	0,0	0,0	3	0	25	3	0	0	0	0	0	0	0	0	0	0	0	0				
-	I	66	3	0	0	21	0,0	0	33	0,0	0,0	0,0	0,0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
YES	NL	61	3	0	0	5	8	0,0	2	3	19	0,0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
-	P	26	77	0	23	46	7,7	15	7,7	31,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
YES	S	1	0	0	0	0	0,0	0	0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
YES	UK(E+W)	52	2	0	10	0	0	0	4	0,0	0,0	0,0	0,0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
YES	LV	3	0	0	0	0	0,0	0	0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NO	SI	37	5	0	0	16	19	0,0	3	3	8	0,0	0,0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-	DK	35	3	0	3	49	0	0	6	0,0	0,0	0,0	0,0	14	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Other animals																																	
YES	UK(E+W)	5	0	0	0	0	0	0	0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixim (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 10. Antibiotic resistance testing of Salmonella Enteritidis - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR				
Animals not specified																													
-	I	22	9	0	0	9	9	0,0	0	36	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0		
Food not specified imported																													
NO	D	263	0	0	0	2	8	0,0	1	1	2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	
Humans																													
-	B	98	0	0	2	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	
-	DK	326	2	0	3	15	1	2	1	2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1	0	0	0	0	0	0	0	
-	IRL	205	4	0	8	33	0,0	2	4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	3	0	0	0	0	0	0	0	0	
YES	NL	609	3	1	0	6	14	0,0	0	3	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	
Humans imported cases																													
-	DK	86	1	0	1	24	1	2	1	2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	0	0	0

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen. Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Cefixur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 11. Antibiotic resistance testing of Salmonella Typhimurium - Percentage of resistant isolates 2003

Monitoring		Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFF	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR	
S. Typhimurium																											
Cattle																											
NO	A	1	100	100	100	100	100	0	0,0	0	0	100						0,0				100	0	0	0	0	0
NO	D	207	73	53	51	71	4	4	0,0	3	3	80						0,0				79	0	1	1		
YES	DK	28	39	7	7	25	4	4	0,0	0	0	39		0,0				0,0				36	0	4			
YES	FIN	5	0	0	0	0	0	0	0,0	0	0	0						0,0				0	0	0			
NO	F	37	65	60	62	3	3	0,0	0	0	73		0,0	0,0	0,0	0,0					78	0		0			
-	I	26	69	69	77	0	0	0	0,0	0	69		0,0	0,0	0,0						77	0	0	0	0		
YES	L	2	100	100	100	100	100	0	100,0	0	100	0,0									100	0	0	0	0		
NO	NL	10	60	50	50	50	0	0,0	14	10	0,0										0	0	0	0			
YES	S	1	0	0	0	0	0	0,0	0	0	0							0,0			0	0	0	0			
YES	N	1	0	0	0	0	0	0,0	0	0	0							0,0			0	0	0	0			
YES	UK(E+W)	176	88	70	80	13	33	79	0,0	44,0											67	0	1				

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme: NO - Isolates collected not within a monitoring programme: - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Cefazidime (CAZ), Cefoperazone (CFF), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 11. Antibiotic resistance testing of Salmonella Typhimurium - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Pigs																											
NO	A	1	100	100	100	100	0	0,0	0	100	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	100	0	0	0	0	0	
NO	D	291	89	48	44	86	1	0,0	23	23	92	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	87	3	9	9	9	9	
YES	DK	547	36	9	5	19	0	0,0	9	36	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	34	2	8	8	8	8	
YES	E	29	93	59	14	76	3	0,0	10	79	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	52	7	3	3	3	3	3	
YES	FIN	3	0	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	
NO	F	7	86	29	43	0	0,0	14	57	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	57	0	0	0	0	0	0	
-	I	42	86	14	81	5	0,0	19	81	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	62	0	0	0	0	0	5	
YES	NL	64	63	17	14	31	0	0,0	23	22	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	
YES	S	3	0	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	
YES	N	1	0	0	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	
YES	UK(E+W)	202	92	68	82	12	68	0,0	68	92	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	74	9	16	16	16	16		
NO	LV	1	0	0	100	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	100	0	0	0	0	0	
Pork																											
YES	DK	9	44	0	0	44	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0	0	
Pork imported																											
-	DK	42	93	26	24	60	7	14	64	14	64	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	60	0	0	0	0	0	0	

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme: NO - Isolates collected not within a monitoring programme: - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Cefazidime (CAZ), Cefoperazone (CFP), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 11. Antibiotic resistance testing of Salmonella Typhimurium - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFF	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Poultry																											
NO	A	51	12	12	28	0	0,0	4	14							0,0					14	2			0		
NO	D	31	74	42	32	81	0	10	84							0,0					71	0	10		10		
YES	DK	13	31	8	8	39	0	0,0	8	31		0,0				0,0					23	0	0		0		
YES	FIN	7	0	0	0	0	0	0	0	0						0,0					0	0	0		0		
NO	F	63	49	32	35	3	0,0	5	36			0,0	0,0	0,0		0,0					70	2			0		
NO	EL	1	100					100																100			
-	I	70	57	43	63	23	0,0	0	69			0,0	0,0								54	1	11		11		
YES	NL	22	64	46	37	55	9	0,0	19	14		0,0										0	0		0		
-	P	2	100	100	100	0	0,0	100								0,0					100	100	100		100		
YES	S	2	0	0	0	0	0,0	0	50							0,0					50	0	0		0		
YES	N	1	0	0	0	0	0,0	0	0							0,0					0	0	0		0		
YES	UK(E+W)	68	87	78	86	40		18	87						0,0	45,9					80	0	2		2		
NO	SI	4	25	25	25	25	0,0	0	50						0,0						50	0			25		
Other animals																											
NO	F	82	27	0	0	1	0,0	0	0			0,0	0,0	0,0							52	0			0		
YES	L	4	50	50	50	50	0,0	0	50			0,0									100	0	0		0		
NO	P	2	100	100	100	0	0,0	100						0,0							100	0	0		0		
YES	S	43	0	0	0	0	0,0	0	0							0,0					0	0	0		0		
NO	N	7	14	0	0	14	0	0,0	14	14						0,0					14	14	14		14		
YES	UK(E+W)	18	67	67	78	0		11	89						16,5						67	0	0		0		

NOTE:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme: NO - Isolates collected not within a monitoring programme: - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Cefazidime (CAZ), Cefoperazone (CFF), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 11. Antibiotic resistance testing of Salmonella Typhimurium - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFF	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Animals not specified																											
-	I	200	47	17	29	8	3,5	5	50	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	44	1	5	7			
-	UK(E+W)	1226	74	59	69	13	38	73													62	6	6	4			
Food not specified imported																											
NO	D	306	66	39	38	57	3	0,3	14	14	66						0,0	0,0	0,0	58	0	3	3				
Humans																											
-	B	628	42	21	25	3	1,0	10	10	40				0,0							34	2	2			2	
-	DK	392	49	13	10	38	2	3	49					0,0							49	2	2			1	
-	IRL	135	76	58	77	3	0,0	22	79												66	2	2			0	
YES	NL	346	58	25	21	45	3	0,0	13	12	52	0,6									1	1	1				
Humans imported cases																											
-	DK	56	68	38	30	66	14	13	73					2,0							68	11				2	

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.
Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
YES - Isolates collected within a monitoring programme: NO - Isolates collected not within a monitoring programme: - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Cefazidime (CAZ), Cefoperazone (CFF), Cefitiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 12. Antibiotic resistance testing of other Salmonella serovars - Percentage of resistant isolates 2003

	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CRO	STR	GEN	NEO	KAN	APR
S. Blockley	Poultry	8	100	100	0	83	0,0	13	0	0									0	0	100	100	
	Other animal	3	100		33		0,0	0											33	33	33		
S. Brandenburg	Pigs	5	0	0	0	0	0,0	0	0	0						0,0			0	0	0	0	
	Humans	62	3	3	2	0	0,0	0	0	3			0,0						7	0	0	0	
S. Derby	Pigs	33	9	0	15	0	0,0	18	18	21						0,0			9	0	36	36	
	Humans	86	2	0	0	0	0,0	2	2	2			0,0						2	2	0	0	
S. Dublin	Cattle	900	1	1	1	1	1	1	1	1			0,0	0,0					1	0	1		
	Cattle	1			0		0,0																
	Pigs	1	0	0	0	0	0	0	0	0			0,0	0,0					0	0	0	0	
	Poultry	2	0	0	0	0	0	0	0	0			0,0	0,0					0	0	0	0	
	Other animal	39	0	0	0	0	0	0	0	0			0,0	0,0					0	0	0	0	
Other animal	1	0	0	0	0	0,0	0	0	0										0				
Animals not	UK(E+W)	949	1	1	1	1	0	0	1	1									1	0	0		
S. Gallinarum/ S. Pullorum	Poultry	2	0	0	0	0	0,0	0	0	0						0,0			0	0	0	0	
S. Hadar	Poultry	76	3	3	89	92	5,3	0	42	42		71,1	0,0					42	0	5	8		
	Animals not	34	100	0	94	94	46,4	0	24	24		76,4	0,0					100	0	6	6		
	Humans	84	90	0	52	88	0,0	5	5	5			0,0						71	0	7		
S. Heidelberg	Poultry	37	35	16	3	38	0	0,0	11	11						0,0			57	30	22	22	
	Poultry	1	100		100																	100	

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulphonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Cefazidime (CAZ), Cefoperazone (CFP), Ceftiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 12. Antibiotic resistance testing of other Salmonella serovars - Percentage of resistant isolates 2003

	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CRO	STR	GEN	NEO	KAN	APR	
S. Hessarek	Pigs	N	1	0	0	0	0	0,0	0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
S. Indiana	Cattle	F	14	0	0	0	0	0,0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	57	0	0	0	0	0
	Poultry	F	36	19	6	17	0	0,0	22	22	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	89	0	0	3	0	0
	Other animal	F	67	31	0	24	1	0,0	31	30	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	78	0	0	9	0	0
S. Infantis	Cattle	D	16	0	6	6	0	0,0	0	0	0	0	0	0	0	6,2	0,0	0,0	6	0	0	0	0	0
	Cattle	FIN	2	0	0	0	0	0,0	0	0	0	0	0	0	0	0,0	0,0	0,0	0	0	0	0	0	0
	Pigs	FIN	1	0	0	0	0	0,0	0	0	0	0	0	0	0	0,0	0,0	0,0	0	0	0	0	0	0
	Poultry	A	26	23	0	19	0	0,0	27	27	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
S. Kottbus	Poultry	F	31	81	0	68	100	0,0	10	19	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	52	0	0	0	0	0
	Other animal	F	73	37	0	34	88	0,0	5	5	4,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	34	0	0	0	0	0
S. Ohio	Pigs	P	1	0	0	0	0,0	0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
S. Paratyphi B var. Java	Poultry	NL	149	23	1	0	53	34	0,0	78	100	29								3	0	0	0	0
S. Rissen	Pigs	E	34	85	15	0	24	0	0,0	9	18								18	3	0	0	0	0
S. Saintpaul	Poultry	D	53	17	13	9	100	96	13,2	6	8	100				1,9			100	47	8	26	0	0
S. Senftenberg	Cattle	F	1	0	0	0	0	0,0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
	Cattle	N	1	0	0	0	0	0,0	0	0	0	0	0	0,0	0,0	0,0	0,0	0,0	0	0	0	0	0	0
S. Saintpaul	Poultry	F	46	30	4	2	24	0,0	2	2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	9	0	0	2	0	0
	Other animal	F	15	0	0	0	0	0,0	0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	20	0	0	0	0	0

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulphonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Cefazidime (CAZ), Cefoperazone (CFP), Ceftiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 12. Antibiotic resistance testing of other Salmonella serovars - Percentage of resistant isolates 2003

	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CRO	STR	GEN	NEO	KAN	APR
S. Tennessee																0,0							
Pigs	FIN	2	0	0	0	0	0,0	0	0	0						0,0							
Poultry	FIN	1	0	0	0	0	0,0	0	0	0						0,0							
S. Virchow																							
Cattle	I	2	0	0	0	100	0,0	0	0	0	0,0	0,0											
Pigs	I	2	0	0	100	100	0,0	0	0	0	0,0	0,0											
Poultry	D	52	0	2	2	2	0,0	2	2	2					0,0								
Poultry	I	72	3	0	69	79	0,0	0	33	33	2,8	2,8											
Animals not	I	4	0	0	0	50	0,0	0	50	50	0,0	0,0											
Humans	B	88	50	0	34	86	0,0	52	52	52	13,6	13,6							9	2	2	5	
Salmonella, not S.Dublin, S. Typhimurium	UK(E+W)	3652	16	5	4	2		12	19	19									10		6		0
Salmonella, other than S. Typhimurium																							
Cattle	S	7	0	0	0	14	14,3		0	0						0,0							
Pigs	S	34	0	0	0	0	0,0	0	0	0					0,0								
Poultry	S	5	0	0	0	0	0,0	0	0	0					0,0								
Other animal	S	4	0	0	0	0	0,0	0	25	25					0,0			25		0	0		

Note:

The figures given in the line Salmonella represent the overall number of isolates tested as reported by the country, the figures given in the line Salmonella # represent the calculated sum of those Salmonella serotypes tested which were reported by the country. Thus, not all Salmonella strains tested might be included in this figure.

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Cefazidime (CAZ), Cefoperazone (CFP), Ceftiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 13 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003-Tetracycline

Compound	Number tested	Distribution (%) of MICs																						
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Tetracycline																								
<i>Salmonella</i> spp.																								
Spain	118								10,2	5,9								0,8	4,2	28,0	38,1	12,7		
Finland	36								33,3	63,9	2,8													
The Netherlands	360							0,3	18,1	50,0	12,5	1,1						0,3	2,8	3,6	11,4			
	82							72,0	18,3	3,7	1,2									3,7	1,2			
	694							0,1	12,0	60,7	9,7	0,6								3,5	3,9	9,7		
Sweden	101								3,0	73,3	21,8	1,0										1,0		
Norway	4								25,0	75,0														
<i>S. Enteritidis</i>																								
Germany	67								97,0	1,5									1,5					
Denmark	14								100,0															
Spain	21								23,8	76,2														
Finland	3								66,7	33,3														
The Netherlands	1								100,0															
	32								6,3	81,3	6,3											6,3		
<i>S. Typhimurium</i>																								
Germany	207								26,6										2,9	70,5				
	291								10,3	0,3	0,3								2,7	86,3				
Denmark	28								60,7											7,1	32,1			
	547								63,1	0,9									1,3	4,6	30,2			
	51								15,7										2,0	11,8	70,6			
	13								69,2											7,7	23,1			
Spain	29								6,9										3,4	17,2	41,4	27,6	3,4	
Finland	15								33,3	66,7														
	8								25,0	75,0														
Norway	10								50,0	40,0											10,0			
<i>S. Infantis</i>																								
Finland	3								33,3	66,7														
<i>S. Saintpaul</i>																								
Germany	53								24,5	54,7	3,8									17,0				
<i>S. Rissen</i>																								
Spain	34								2,9	11,8											38,2	41,2	5,9	
<i>S. Tennessee</i>																								
Finland	3								33,3	33,3	33,3													
<i>S. Brandenburg</i>																								
Finland	5								60,0	40,0														

Table AB 14 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 - Chloramphenicol

Compound	Number tested	Distribution (%) of MICs																					
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
Chloramphenicol																							
<i>Salmonella</i> spp.																							
Spain	118										34,7	34,7	2,5	0,8	5,1	3,4	14,4	4,2					
Finland	36										94,4	5,6											
The Netherlands	985										7,9	76,5	9,6	0,7	0,1	1,6	3,5						
	167										36,5	56,3	6,6			0,6							
	1337										8,9	79,3	3,8	0,2	0,2	1,8	5,8						
Sweden	101								2,0	73,3	23,8	1,0											
Norway	4								50,0	50,0													
<i>S. Enteritidis</i>																							
Germany	67								3,0	73,1	23,9												
Denmark	14								92,9	7,1													
Spain	21								61,9	38,1													
Finland	3								100,0														
The Netherlands	1								100,0														
The Netherlands	46								10,9	87,0	2,2												
<i>S. Typhimurium</i>																							
Germany	207								16,9	28,5	1,9			0,5	52,2								
	118								0,8	28,8	31,4	4,2	0,8	33,9									
	291								2,1	23,4	21,6	5,2	0,7	47,1									
Denmark	28								10,7	46,4	35,7					7,1							
	547								6,2	55,9	27,1	1,8	0,2	0,9									
	51								2,0	47,1	29,4					21,6							
	13								7,7	61,5	15,4	7,7				7,7							
Spain	29								31,0	10,3						6,9	44,8	6,9					
Finland	15								100,0														
	8								100,0														
Norway	10								10,0	90,0													
<i>S. Infantis</i>																							
Finland	3								100,0														
<i>S. Rissen</i>																							
Spain	34								17,6	64,7	2,9			2,9	5,9	5,9							
<i>S. Saintpaul</i>																							
Germany	53										7,5	79,2	3,8	9,4									
<i>S. Tennessee</i>																							
Finland	3								33,3	66,7													
<i>S. Brandenburg</i>																							
Finland	5								100,0														

Table AB 15 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 - Florfenicol

Compound	Number tested	Distribution (%) of MICs																						
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Florfenicol																								
<i>Salmonella</i> spp.																								
Spain	118		0,8	77,1	15,3	3,4								2,5	0,8									
Finland	36			88,9	11,1									2,8	0,1	0,4								
The Netherlands	985		2,0	57,6	32,8	4,3									43,3									
	171		0,6	47,4	8,8										13,5									
	1337		10,7	70,2	2,5	0,1									3,1									
Sweden	101					76,2	21,8	2,0																
Norway	4					25,0	75,0																	
<i>S. Enteritidis</i>																								
Germany	67		4,5	94,0	1,5																			
Denmark	14		100,0																					
Spain	21		4,8	90,5	4,8																			
Finland	3			66,7	33,3																			
	1			100,0																				
The Netherlands	46			84,8	15,2																			
<i>S. Typhimurium</i>																								
Germany	207		0,5	38,6	8,2	1,4								15,9	35,3									
	118		4,2	50,8	10,2	1,7								16,9	16,1									
	291		6,5	35,7	11,3	2,4								15,1	28,9									
	28		10,7	64,3	17,9									7,1										
	547		8,0	70,7	15,9	0,7								3,8	0,5	0,2								
	51		3,9	68,6	7,8									11,8	7,8									
	13		15,4	69,2	7,7									7,7										
Spain	29		3,4	79,3	3,4									10,3	3,4									
Finland	15			100,0																				
	8			100,0																				
Norway	10			80,0	20,0																			
<i>S. Infantis</i>																								
Finland	3			100,0																				
<i>S. Saintpaul</i>																								
Germany	53			3,8	35,8	50,9								3,8	5,7									
<i>S. Rissen</i>																								
Spain	34			70,6	26,5	2,9																		
<i>S. Tennessee</i>																								
Finland	3			33,3	66,7																			
<i>S. Brandenburg</i>																								
Finland	5			80,0	20,0																			

Table AB 16 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003- Ampicillin and Amoxicillin/clavulanate

Compound	Number tested	Distribution (%) of MICs																						
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Ampicillin																								
<i>Salmonella</i> spp.																								
Spain	118									55,1	5,1	1,7												
Finland	36						8,3			55,6	33,3	2,8												
The Netherlands	985						17,3			60,3	3,7	0,1			0,1	15,1								
	171								0,6	47,4	8,8					43,3								
	1337								10,7	70,2	2,5	0,1				13,5								
Sweden	101								4,0	77,2	17,8	1,0												
Norway	4								50,0	50,0														
<i>S. Enteritidis</i>																								
Germany	67								77,6	17,9														
Denmark	14								100,0															
Spain	21								76,2	23,8														
Finland	3								100,0															
	1								100,0															
The Netherlands	46								13,0	78,3	4,3					2,2								
<i>S. Typhimurium</i>																								
Germany	207								21,7	4,8	2,4					71,0								
	118								32,2	8,5						59,3								
	291								11,3	2,4	0,3					85,9								
Denmark	28								50,0	25,0						25,0								
	547								68,2	11,7	1,1					19,0								
	51								37,3	5,9						56,9								
	13								53,8	7,7						38,5								
Spain	29								20,7		3,4													
Finland	15								40,0	53,3	6,7													
	8								75,0	25,0														
Norway	10								90,0															
<i>S. Infantis</i>																								
Finland	3								100,0															
<i>S. Saintpaul</i>																								
Germany	53															100,0								
<i>S. Rissen</i>																								
Spain	34									64,7	11,8													
<i>S. Tennessee</i>																								
Finland	3									66,7	33,3													
<i>S. Brandenburg</i>																								
Finland	5									80,0	20,0													

Table AB 17 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003- Nalidixic Acid

Compound	Number tested	Distribution (%) of MICs																					
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
Nalidixic acid																							
<i>Salmonella</i> spp.																							
Spain	118									50,0	39,0	5,9	1,7				1,7						
Finland	36									2,8	72,2	25,0											
The Netherlands	985									16,5	64,3	7,5	1,3		0,7	4,5	3,6						1,6
	171									4,7	31,0	5,3	4,7		4,1								6,2
Sweden	242									5,0	77,7	9,5	0,8		0,8								2,0
Norway	101									56,4	41,6												
Norway	4									75,0	25,0												
<i>S. Enteritidis</i>																							
Germany	67									76,1	7,5						16,4						
Denmark	14									78,6	7,1						14,3						
Spain	21									9,5							28,6						61,9
Finland	3									100,0													
The Netherlands	1									100,0													
The Netherlands	46									4,3	82,6	8,7	2,2										
<i>S. Typhimurium</i>																							
Germany	207									85,5	10,6						3,9						
	118									89,8	8,5						1,7						
	291									79,4	16,8	2,4				0,3	1,0						3,6
Denmark	28									96,4													0,4
	547									99,3	0,4												5,9
	51									92,2	2,0												
	13									100,0													
Spain	29									55,2	34,5	6,9					3,4						
Finland	15									80,0	20,0												
	8									87,5	12,5												
Norway	10									100,0													
<i>S. Infantis</i>																							
Finland	3									33,3	66,7												
<i>S. Saintpaul</i>																							
Germany	53									3,8							96,2						
<i>S. Rissen</i>																							
Spain	34									44,1	55,9												
<i>S. Tennessee</i>																							
Finland	3									100,0													
<i>S. Brandenburg</i>																							
Finland	5									60,0	40,0												

Table AB 18 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 - Fluoroquinolones

Compound	Number tested	Distribution (%) of MICs																					
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
Ciprofloxacin																							
<i>Salmonella</i> spp.																							
Spain	118				96,6	0,8	2,5																
The Netherlands	985				89,1	2,0	3,8	3,0	1,9	0,1													
Food	171				43,9	38,0	8,8	8,8	0,6														
Humans	1337				87,8	3,0	6,8	1,8	0,4	0,1													
<i>S. Enteritidis</i>																							
Germany	67				83,6		11,9	4,5															
Denmark	14				85,7		7,1	7,1															
Spain	21						9,5	4,8	76,2	9,5													
The Netherlands	46						97,8	2,2															
<i>S. Typhimurium</i>																							
Germany	207				94,7	1,0	0,5	1,9	1,4	0,5													
Meat	118				93,2	5,1			0,8														
Pigs	291				90,4	7,9	1,0	0,7															
Poultry meat (G. gallus)	67				83,6		11,9	4,5															
Denmark	28				85,7	10,7	3,6																
Pigs	547				94,3	5,3		0,4															
Pork	51				92,2	2,0	5,9																
Poultry (G.gallus)	13				92,3	7,7																	
Spain	29				96,6		3,4																
<i>S. Saintpaul</i>																							
Germany	53				3,8			22,6	60,4	13,2													
<i>S. Rissen</i>																							
Spain	34						97,1	2,9															

Compound	Number tested	Distribution (%) of MICs																						
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Enrofloxacin																								
Salmonella spp.																								
Finland	36					30,6	69,4																	
Sweden	101					25,7	69,3	3,0	2,0															
Norway	4			50,0		25,0	25,0																	
S. Enteritidis																								
Finland	3					100,0																		
Cattle	1					100,0																		
S. Typhimurium																								
Norway	10					10,0	90,0																	
Finland	15					6,7	93,3																	
Food	8					12,5	87,5																	
S. Infantis																								
Finland	3					100,0																		
Animals																								
S. Tennessee																								
Finland	3					100,0																		
Animals																								
S. Brandenburg																								
Finland	5					60,0	40,0																	
Pigs																								

Table AB 19 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 - Sulfonamides

Compound	Number tested	Distribution (%) of MICs																					
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
Sulfonamide																							
<i>Salmonella</i> spp.																							
Finland	Animals	36											80,6	16,7	2,8								
Sweden	Animals	101											27,7	49,3	2,0	7,9	54,5	33,7					
The Netherlands	Animals	213											4,3	8,4	1,0	0,1	0,1				19,2		
	Humans	1337											4,3	8,4	1,0	0,1	0,1				4,2		
Norway	Animals	4											75,0	25,0									
<i>S. Enteritidis</i>																							
Germany	Poultry meat (G. gallus)	67											14,9	77,6	6,0						1,5		
Denmark	Poultry (G.gallus)	14											33,3	66,7	92,9	7,1							
Finland	Food	3											100,0										
	Cattle	1											20,0	40,0	6,7	13,3					20,0		
The Netherlands	Poultry	15											20,0	40,0	6,7	13,3					20,0		
<i>S. Typhimurium</i>																							
Denmark	Cattle	28											53,6	7,1							39,3		
	Pigs	547											61,8	2,0	0,2						0,2		35,8
	Pork	51											39,2	2,0							58,8		
	Poultry (G.gallus)	13											69,2								30,8		
Finland	Animals	15											73,3	20,0	6,7								
	Food	8											75,0	25,0									
Germany	Cattle	207											2,4	15,9	1,9						79,7		
	Meat	118											6,8	22,9	7,6						62,7		
	Pigs	291											2,1	4,1	1,0	0,3					92,4		
Norway	Animals	10											70,0	20,0							10,0		
<i>S. Infantis</i>																							
Finland	Animals	3											100,0										
<i>S. Saintpaul</i>																							
Germany	Turkey	53																			100,0		
<i>S. Tennessee</i>																							
Finland	Animals	3											100,0										
<i>S. Brandenburg</i>																							
Finland	Pigs	5											80,0	20,0									

Table AB 20 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 - Trimethoprim and Sulfonamide/Trimethoprim

Compound	Number tested	Distribution (%) of MICs																					
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
Trimethoprim																							
<i>Salmonella</i> spp.																							
Finland	36						55,6	30,6	11,1	2,8													
The Netherlands	806						58,3	15,9	0,7	2,4	1,7	0,2											
	171						27,5	21,6	1,2	5,8	3,5												
	1337							84,7	8,2	0,6	0,3												
Sweden	101						4,0	72,3	20,8	3,0													
Norway	4						25,0	50,0	25,0														
<i>S. Enteritidis</i>																							
Germany	67										95,5	3,0											
Denmark	14										100,0												
Finland	3						100,0																
	1						100,0																
The Netherlands	46							89,1	6,5														4,3
<i>S. Typhimurium</i>																							
Germany	207										95,7	1,0											
	118										86,4	1,7											
	291										75,6	1,0											
Denmark	28										100,0												
	547										90,9												
	51										88,2												
	13										92,3												
Finland	15							60,0	26,7	13,3													
	8							25,0	75,0														
Norway	10							10,0	80,0														10,0
<i>S. Infantis</i>																							
Finland	3							33,3	66,7														
<i>S. Saintpaul</i>																							
Germany	53										86,8	5,7											7,5
<i>S. Tennessee</i>																							
Finland	3							33,3	66,7														
<i>S. Brandenburg</i>																							
Finland	5							100,0															

Compound	Number tested	Distribution (%) of MICs																				
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Sulfonamide- Trimethoprim																						
Salmonella spp.																						
The Netherlands	116						76,7	3,4	0,9	0,9					18,1							
Animals	28						46,4	35,7							17,9							
Food	1095						91,8	1,8	0,1	0,3	0,2				5,8							
Humans																						
S. Enteritidis																						
Germany	67								95,5	3,0		1,5										
Poultry meat (G. gallus)	31						96,8								3,2							
The Netherlands																						
Poultry																						
S. Typhimurium																						
Germany	207								95,2	1,4		3,4										
Cattle	118								86,4	3,4		10,2										
Meat	291								74,2	2,4		23,4										
Pigs																						
S. Saintpaul																						
Germany	53								83,0	11,3		5,7										
Turkey																						

Table AB 21 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 - Cephalosporins

Compound	Number tested	Distribution (%) of MICs																					
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
3rd gen. Cephalosporin																							
<i>Salmonella</i> spp.																							
The Netherlands	Animals					85,3	11,6	2,3	0,1		0,2	0,1	0,2	0,2									
	Food					84,2	11,7	2,3		1,2			0,6										
	Humans					92,3	6,8	0,5					0,2	0,1									
S. Enteritidis																							
The Netherlands	Poultry					84,8	15,2																
Ceftiofur																							
<i>Salmonella</i> spp.																							
Finland	Animals								25,0	66,7	8,3												
Sweden	Animals								2,0	5,0	88,1	5,0											
Norway	Animals								25,0	25,0	50,0												
S. Enteritidis																							
Denmark	Poultry (G.gallus)								78,6	21,4													
Finland	Food									100,0													
	Cattle									100,0													
S. Typhimurium																							
Germany	Cattle								42,5	52,7	4,8												
	Meat								60,2	34,7	5,1												
	Pigs								47,1	43,3	9,3			0,3									
	Poultry meat (G. gallus)								67,2	31,3	1,5												
Denmark	Cattle								50,0	50,0													
	Pigs								54,7	42,0	3,3												
	Pork								56,9	43,1													
	Poultry (G.gallus)								92,3	7,7													
Finland	Animals								26,7	73,3													
	Food								25,0	75,0													
Norway	Animals								10,0	90,0													
S. Saintpaul																							
Germany	Turkey								3,8	1,9	77,4	15,1	1,9										
S. Infantis																							
Finland	Animals								33,3		66,7												
S. Tennessee																							
Finland	Animals									66,7	33,3												
S. Brandenburg																							
Finland	Pigs									100,0													

Compound	Number tested	Distribution (%) of MICs																						
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
S. Enteritidis																								
Denmark	14										92,9	7,1												
S. Typhimurium																								
Denmark	28										46,4	32,1	21,4											
Pigs	547										50,6	34,4	11,3	2,7	0,5									
Pork	51										25,5	47,1	25,5	2,0										
Poultry (G.gallus)	13										61,5	15,4	23,1											
Cefotaxim																								
Salmonella spp.																								
Spain	118									16,9	55,1	11,9	11,0	3,4	0,8									0,8
S. Enteritidis																								
Spain	21									19,0	76,2	4,8												
S. Typhimurium																								
Spain	29									17,2	31,0	6,9	31,0	13,8										
S. Rissen																								
Spain	34									8,8	58,8	23,5	5,9											2,9

Table AB 22 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 - Streptomycin

Compound	Number tested	Distribution (%) of MICs																						
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Streptomycin																								
<i>Salmonella</i> spp.																								
Finland	Animals	36										5,6	30,6	50,0	13,9									
Sweden	Animals	101										2,0	29,7	41,6	21,8		2,0							
Norway	Animals	4										50,0		25,0	25,0									
<i>S. Enteritidis</i>																								
Germany	Poultry meat (G. gallus)	67										94,0	3,0											
Denmark	Poultry (G.gallus)	14										92,9	7,1											
Finland	Food	3										66,7	33,3											
	Cattle	1										100,0												
<i>S. Typhimurium</i>																								
Germany	Cattle	207										1,0	15,5	4,3	1,0	78,3								
	Meat	118										3,4	33,1	5,1		58,5								
	Pigs	291										1,0	6,9	4,8	1,4	85,9								
Denmark	Cattle	28										7,1	42,9	14,3	3,6	7,1	25,0							
	Pigs	547										3,5	53,7	9,0	1,8	5,5	26,5							
	Pork	51										2,0	39,2	2,0	2,0	11,8	43,1							
Finland	Poultry (G.gallus)	13										15,4	46,2	15,4		7,7								
	Animals	15										26,7	53,3	20,0										
	Food	8										12,5	87,5											
Norway	Animals	10										40,0	50,0											10,0
<i>S. Infantis</i>																								
Finland	Animals	3										33,3	66,7											
<i>S. Saintpaul</i>																								
Germany	Turkey	53													17,0	83,0								
<i>S. Tennessee</i>																								
Finland	Animals	3												66,7	33,3									
<i>S. Brandenburg</i>																								
Finland	Pigs	5											40,0	60,0										

Table AB 23 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 -Gentamicin

Compound	Number tested	Distribution (%) of MICs																						
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Gentamicin																								
<i>Salmonella</i> spp.																								
Spain	118		1,7	28,0	49,2	13,6	0,8							0,8	1,7	3,4	0,8							
Finland	36			5,6	88,9	5,6																		
The Netherlands	985		48,4	41,7	7,1	1,1	0,1							1,1	0,2	0,1								
	171		25,7	60,2	11,7	1,8								0,6										
Sweden	1337		48,6	41,9	7,5	1,1								0,4	0,1	0,4								
Finland	101			14,9	59,4	21,8	4,0																	
Norway	4			75,0	25,0																			
<i>S. Enteritidis</i>																								
Germany	67				98,5										1,5									
Denmark	14				100,0																			
Spain	21			23,8	61,9	14,3																		
Finland	3				33,3	66,7																		
The Netherlands	1				100,0																			
The Netherlands	46			60,9	37,0	2,2																		
<i>S. Typhimurium</i>																								
Germany	207				99,5	0,5																		
	118				99,2	0,8																		
	291				94,8	1,0								1,4	1,7									
Denmark	28				100,0																			
	547				96,9	0,7								0,4	0,5	0,7								
	51				100,0																			
	13				100,0																			
Spain	29				41,4	44,8	6,9									3,4	3,4							
Finland	15				93,3	6,7																		
	8				12,5	75,0	12,5																	
Norway	10				70,0	20,0																		10,0
<i>S. Infantis</i>																								
Finland	3				33,3	66,7																		
<i>S. Saintpaul</i>																								
Germany	53				3,8									49,1	43,4	3,8								
<i>S. Rissen</i>																								
Spain	34				2,9	26,5	41,2	23,5	2,9															
<i>S. Tennessee</i>																								
Finland	3				66,7	33,3																		
<i>S. Brandenburg</i>																								
Finland	5				100,0																			

Table AB 24 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 -Neomycin

Compound	Number tested	Distribution (%) of MICs																					
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
Neomycin																							
<i>Salmonella</i> spp.																							
Spain	118							5,9	20,3	40,7	25,4	4,2			0,8	2,5							
Finland	36									94,4	5,6												
The Netherlands	985								89,9	8,6	0,8		0,1										
	163							3,1	86,5	6,7			0,6										
	1337								89,1	9,2	0,6	0,1											
Sweden	101									84,2	15,8												
Norway	4									100,0													
<i>S. Enteritidis</i>																							
Germany	67									100,0													
Denmark	14									100,0													
Spain	21								42,9	28,6													
Finland	3									100,0													
The Netherlands	1									100,0													
The Netherlands	46								83,5	6,5													
<i>S. Typhimurium</i>																							
Germany	207									98,6	0,5												
	118									95,8													
	291									91,1													
	28									96,4													
	547									91,8	0,5	0,2											
	51									100,0													
	13									100,0													
Spain	29								6,9	20,7	51,7	13,8	3,4										
Finland	15									100,0													
	8									100,0													
Norway	10									90,0													
<i>S. Infantis</i>																							
Finland	3									100,0													
<i>S. Saintpaul</i>																							
Germany	53									90,6	1,9												
<i>S. Rissen</i>																							
Spain	34									8,8	20,6	38,2	29,4	2,9									
<i>S. Tennessee</i>																							
Finland	3									100,0													
<i>S. Brandenburg</i>																							
Finland	5									80,0	20,0												

Table AB 25 Antimicrobial resistance in *Salmonella* spp. Distribution (%) of MIC-values 2003 - Kanamycin and other Aminoglycosides

Compound	Number tested	Distribution (%) of MICs																					
		<=0,0039	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
Kanamycin																							
S. Enteritidis																							
Germany	67	98,5																					
Poultry meat (G. gallus)		1,5																					
S. Typhimurium																							
Germany	207	97,6																					
Cattle		1,0																					
Meat	118	95,8																					
Pigs	291	89,7																					
		0,3																					
		0,3																					
		0,7																					
		8,9																					
S. Saintpaul																							
Germany	53	3,8																					
		69,8																					
		26,4																					
Spectinomycin																							
S. Enteritidis																							
Denmark	14	50,0																					
Poultry (G.gallus)		50,0																					
S. Typhimurium																							
Denmark	28	89,3																					
Cattle	547	0,7																					
Pigs	51	80,4																					
Pork	13	70,6																					
Poultry (G.gallus)		15,4																					
		76,9																					
		1,6																					
		12,2																					
		27,5																					
		7,7																					
Apramycin																							
S. Enteritidis																							
Denmark	14	100,0																					
Poultry (G.gallus)		100,0																					
S. Typhimurium																							
Denmark	28	100,0																					
Cattle	547	97,4																					
Pigs	51	100,0																					
Pork	13	100,0																					
Poultry (G.gallus)		100,0																					
		2,0																					

Table AB 26. Test methods used for antibiotic resistance testing of *Campylobacter* spp. 2003

Standard used for testing	Test method	Country		used for	further remarks	Is the testing procedure subject of quality control
Campylobacter						
NCCLS						
	Agar diffusion	Austria	0	Humans	Inst. of Hygiene, Karl Franz	yes
	Broth dilution	The Netherlands	0	Animals and food		yes
AFA						
	Broth dilution	Norway	2	Humans		yes
Danmap 2003						
	Agar diffusion	Denmark	2	Humans		
	Broth dilution	Denmark	1	Animals and food		
Microbiological Breakpoints						
	Broth dilution	Norway	1	Animals and food		yes
		Sweden	0	Animals and food		yes
n.a.						
	Broth dilution	Spain	0	Animals and food		
		Styria (Austria)	0	Animals and food		yes

Abbreviations:

NCCLS, Performance Standards for Antimicrobial Susceptibility Testing

AFA, Norwegian Reference Group on Antibiotic Susceptibility Testing

Danmap, Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark

Note: If a country is listed more than once, further specification is found under the subsequent columns.

Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 27. Breakpoints used for antibiotic resistance testing of *Campylobacter* spp. - 2003

Antimicrobial	Country		Breakpoints (µg/ml)		Disk content (µg)	Zone diameter (mm)		
			susceptible <=	resistant >		susceptible >=	intermediate	resistant <=
<i>Campylobacter</i> species								
Tetracyclin	Austria	0			30	19	15-18	14
	The Netherlands	0	4	4				
	Spain	0		8				
	Styria (Austria)	0		8				
	Denmark	1		8				
	Denmark	2						32
	Sweden	0	8	8				
	Norway	1		2				
Ampicillin	The Netherlands	0	16	16				
	Spain	0		8				
	Styria (Austria)	0		16				
	Sweden	0	8	16				
	Norway	1		16				
Ciprofloxacin	Austria	0			5	21	16-20	15
	The Netherlands	0	2	2				
	Spain	0		2				
	Styria (Austria)	0		2				
	Norway	2		2				
	Denmark	1		2				
	Denmark	2						27
Enrofloxacin	Sweden	0	1	1				
	Norway	1		0,12				
Nalidixic acid	Austria	0			30	19	14-18	13
	The Netherlands	0	16	16				
	Spain	0		16				
	Styria (Austria)	0		32				
	Norway	2		16				
	Denmark	1		32				
	Denmark	2						27
	Sweden	0	16	16				
Norway	1		16					
Gentamycin	The Netherlands	0	8	8				
	Spain	0		8				
	Styria (Austria)	0		8				
	Norway	2		4				
	Denmark	2						30
	Denmark	1		8				
	Sweden	0	8	8				
	Norway	1		4				

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 27. Breakpoints used for antibiotic resistance testing of *Campylobacter* spp. - 2003

Antimicrobial	Country	Breakpoints ($\mu\text{g/ml}$)		Disk content (μg)	Zone diameter (mm)		
		susceptible \leq	resistant $>$		susceptible \geq	intermediate	resistant \leq
Erythromycin	Austria	0		15	23	14-22	13
	The Netherlands	0	8				
	Spain	0					
	Styria (Austria)	0	16				
	Norway	2	2				
	Denmark	2					
	Denmark	1	16				
	Sweden	0	1				
	Norway	1	8				
Doxycycline	Norway	2	2				

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

**Table AB 28. Antibiotic resistance testing of *Campylobacter* spp. in animals
- Percentage of resistant isolates 2003**

Monitoring	Country	Invest.	TET	AMP	NAL	FQ	SU	STR	GEN	NEO	ERY
Animals											
YES	DK	235	1		4	4,5			0		10
YES	E	140	98	49	95	94,5			19		57
YES	NL	241	61	16	12	12,1			0		12
YES	S	100	1	0	18	16,0			0		0
YES	N	108	2	4	1	0,9			0		0
YES	A(Sty)	480	39	12	42	45,7			1		8

Note: Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
 YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme;
 - no information on the source of the isolates available
 Tetracycline (TET), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulfonamides (SU), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Erythromycin (ERY)

Table AB 29. Antibiotic resistance testing of *Campylobacter* spp. in the individual animal species and humans - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	AMP	NAL	FQ	SU	STR	GEN	NEO	ERY
Cattle											
YES	DK	53	0		8	8,0			0		0
YES	A(Sty)	109	19	11	29	27,3			0		0
Pigs											
YES	DK	98	1		3	3,0			0		24
YES	E	112	100	54	96	95,1			22		65
YES	NL	193	68	11	5	4,7			0		14
YES	S	100	1	0	18	16,0			0		0
YES	A(Sty)	131	76	21	49	50,0			2		24
Poultry											
YES	DK	84	2		4	4,0			0		0
YES	E	28	92	31	92	92,0			8		25
YES	NL	48	33	33	42	42,0			0		0
YES	N	108	2	4	1	0,9			0		0
YES	A(Sty)	240	28	7	45	51,7			0		3
Poultry meat											
YES	DK	77	5		1	1,0		1	0		0
-	E	6	50	17		66,0			0		50
NO	E	192	94		80	75,5					39
NO	UK	1	100	0	0	0,0			0		0
YES	N	31	3	0	3	3,2			0		0
Poultry meat imported											
-	DK	12	42		8	8,0		0	0		0
Humans											
-	DK	107	17		23	23,1		4	4		2
YES	N	63	10		11	7,9			0		5
NO	A(Sty)	430	21		38	38,1					2
Humans imported cases											
YES	N	144	63		73	70,8			4		6

Note: Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
 YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme;
 - no information on the source of the isolates available
 Tetracycline (TET), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulfonamides (SU), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Erythromycin (ERY)

Table AB 30. Antibiotic resistance testing of *Campylobacter* spp. - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	AMP	NAL	FQ	SU	STR	GEN	NEO	ERY
<i>Campylobacter</i>											
Poultry meat											
-	E	6	50	17		66,0			0		50
NO	UK	1	100	0	0	0,0			0		0
<i>C.jejuni</i>											
Cattle											
YES	DK	53	0		8	8,0			0		0
YES	A(Sty)	91	21	11	24	24,0			0		0
Poultry											
YES	DK	84	2		4	4,0			0		0
YES	NL	48	33	33	42	42,0			0		0
YES	N	108	2	4	1	0,9			0		0
YES	A(Sty)	137	25	7	39	47,0			0		2
Poultry meat											
YES	DK	77	5		1	1,0		1	0		0
NO	E	96	96		71	64,0					7
YES	N	31	3	0	3	3,2			0		0
Poultry meat imported											
-	DK	12	42		8	8,0		0	0		0
Humans											
-	DK	107	17		23	23,1		4	4		2
YES	N	63	10		11	7,9			0		5
NO	A(Sty)	385	22		37	36,6					0
Humans imported cases											
YES	N	144	63		73	70,8			4		6

Note: Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
 Isolates from humans in Norway were tested for doxycycline instead of tetracycline
 C.coli isolates from pigs from Sweden were only identified by phenotype
 YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme;
 - no information on the source of the isolates available
 Tetracycline (TET), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulfonamides (SU), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Erythromycin (ERY)

Table AB 30. Antibiotic resistance testing of *Campylobacter* spp. - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	AMP	NAL	FQ	SU	STR	GEN	NEO	ERY
<i>C.coli</i>											
Cattle											
YES	A(Sty)	18	11	11	56	44,0			0		0
Pigs											
YES	DK	98	1		3	3,0			0		24
YES	E	112	100	54	96	95,1			22		65
YES	NL	193	68	11	5	4,7			0		14
YES	S	100	1	0	18	16,0			0		0
YES	A(Sty)	131	76	21	49	50,0			2		24
Poultry											
YES	E	28	92	31	92	92,0			8		25
YES	A(Sty)	103	33	6	52	58,0			0		4
Poultry meat											
NO	E	96	91		89	87,0					70
Humans											
NO	A(Sty)	45	16		53	51,1					13

Note: Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
 Isolates from humans in Norway were tested for doxycycline instead of tetracycline
C.coli isolates from pigs from Sweden were only identified by phenotype
 YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme;
 - no information on the source of the isolates available
 Tetracycline (TET), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ), Sulfonamides (SU), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Erythromycin (ERY)

Table AB 31 Antimicrobial resistance in *Campylobacter* spp. Distribution (%) of MIC-values 2003 - Tetracyclin

Compound	Number tested	Distribution (%) of MICs																		
		<=0,003	0,003	0,006	0,012	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048
Tetracyclin																				
<i>Campylobacter jejuni</i>																				
Styria (Austria)	91				65,0	4,0	4,0	3,0	2,0			4,0	7,0	14,0						
	137				47,0	11,0	6,0	5,0	5,0	1,0		4,0	2,0	18,0						
Denmark	53				100,0								2,4							
	84				97,6								2,4							
	89				87,6			1,1	1,1					10,1						
The Netherlands	48			45,8	2,1	14,6	2,1	2,1	10,4			12,5	10,4							
Norway	108				98,1									1,9						
	31				93,5	3,2								3,2						
<i>Campylobacter coli</i>																				
Styria (Austria)	18				67,0	11,0	6,0	6,0				4,0	6,0	6,0						
	131				8,0	6,0	4,0	2,0	5,0			4,0	7,0	65,0						
	103				43,0	14,0	6,0	2,0	3,0			2,0	9,0	22,0						
Denmark	98				91,8	6,1	1,0							1,0						
Spain	102								2,9			22,5	50,0	22,5	2,0					
	26								7,7			11,5	42,3	38,5						

Table AB 32 Antimicrobial resistance in *Campylobacter* spp. Distribution (%) of MIC-values 2003- Ampicillin

Compound	Number tested	Distribution (%) of MICs																						
		<=0,003	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Ampicillin																								
<i>Campylobacter jejuni</i>																								
Styria (Austria)	91							10,0	10,0	18,0	40,0	8,0	4,0	10,0	1,0									
	137							19,0	20,0	15,0	26,0	7,0	5,0	7,0	1,0									
The Netherlands	48									4,2	31,3	22,9	8,3	6,3	27,1									
Norway	108							3,7	7,4	40,7	32,4	9,3	2,8	2,8	0,9									
	31							9,7	6,5	9,7	54,8	12,9	6,5											
<i>Campylobacter coli</i>																								
Styria (Austria)	18							6,0	17,0	22,0	6,0	28,0	11,0	6,0	6,0									
	103							8,0	5,0	17,0	17,0	40,0	9,0	3,0	3,0									
Spain	102									26,5	4,9	8,8	5,9	2,0	5,9	37,3	7,8	1,0						
	26									23,1	34,6	11,5	3,8	7,7	15,4	3,8								

Table AB 33 Antimicrobial resistance in *Campylobacter* spp. Distribution (%) of MIC-values 2003 - Nalidixic acid

Compound	Number tested	Distribution (%) of MICs																					
		<=0,003	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
<i>Campylobacter jejuni</i>																							
Styria (Austria)	91								8,0	54,0	6,0	4,0	4,0	4,0	4,0	18,0	2,0						
	137								1,0	10,0	28,0	9,0	7,0	7,0	19,0	18,0	2,0						
Denmark	53								32,1	56,6	3,8												
	84								41,7	52,4	2,4												
The Netherlands	89								16,9	69,7	11,2												
	48								25,0	18,8	10,4	4,2				18,8	22,9						
Norway	108								8,3	75,0	15,7						0,9						
	31								3,2	6,5	58,1	29,0				3,2							
<i>Campylobacter coli</i>																							
Styria (Austria)	18								33,0	6,0					6,0	17,0	22,0	17,0					
	131								12,0	29,0	7,0	3,0			3,0	15,0	28,0	7,0					
Denmark	103								5,0	18,0	9,0	4,0			13,0	31,0	19,0	1,0					
	98								7,1	75,5	14,3												
Spain	102								1,0	2,0	1,0				7,8	39,2	42,2	6,9					
	26								3,8	3,8					11,5	65,4	11,5	3,8					

Table AB 34 Antimicrobial resistance in *Campylobacter* spp. Distribution (%) of MIC-values 2003 - Ciprofloxacin

Compound	Number tested	Distribution (%) of MICs																					
		<=0,003	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
<i>Campylobacter jejuni</i>																							
Styria (Austria)	91				3,0	25,0	41,0	2,0	2,0	1,0	1,0	1,0	12,0	4,0	7,0								
	137				6,0	18,0	17,0	7,0	3,0	1,0	1,0	10,0	25,0	13,0									
Denmark	53				3,8	45,3	43,4					1,9	5,7										
	84				2,4	66,7	25,0	2,4				2,2	3,6										
	89				2,2	4,5	50,6	36,0	1,1	2,2	1,1	2,2	2,2										
The Netherlands	48				41,7	12,5	2,1	2,1				4,2	8,3	29,2									
<i>Campylobacter coli</i>																							
Styria (Austria)	18				22,0	6,0	22,0			6,0		11,0	28,0	6,0									
	131				3,0	15,0	24,0	7,0	1,0	1,0		11,0	24,0	12,0	2,0								
	103				4,0	16,0	10,0	5,0	2,0	3,0	3,0	14,0	20,0	17,0	8,0								
Denmark	98				9,2	45,9	35,7	5,1	1,0	1,0		2,0	2,0	1,0									
Spain	102											9,8	37,3	43,1	4,9	1,0							
	26						7,7					34,6	46,2	7,7	3,8								

Table AB 35 Antimicrobial resistance in *Campylobacter* spp. Distribution (%) of MIC-values 2003 - Aminoglycosides

Compound	Number tested	Distribution (%) of MICs																						
		<=0,003	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
<i>Campylobacter jejuni</i>																								
Styria (Austria)	91						65,0	29,0	4,0	2,0														
	137						59,0	31,0	4,0	2,0	2,0													
Denmark	53							90,6	7,5	1,9														
	84							84,5	15,5															
	89							100,0																
The Netherlands	48						97,9	2,1																
Norway	108						2,8	21,3	55,6	20,4														
	31						12,9	22,6	38,7	25,8														
<i>Campylobacter coli</i>																								
Styria (Austria)	18						11,0	67,0	17,0	6,0														
	131						13,0	37,0	42,0	5,0	1,0	1,0				2,0								
	103						25,0	53,0	19,0	2,0														
Denmark	98							35,7	50,0	14,3														
Spain	102							1,0	39,2	37,3	3,9					2,0					19,6			
	26							7,7	84,6													7,7		
Neomycin																								
<i>Campylobacter jejuni</i>																								
Denmark	53								75,5	22,6	1,9													
	84								79,8	17,9	1,2					1,2								
Streptomycin																								
<i>Campylobacter jejuni</i>																								
Denmark	53								41,5	49,1	7,5					1,9								
	84								34,5	57,1	7,1	1,2												
	89								96,7	2,3														1,1

Table AB 36 Antimicrobial resistance in *Campylobacter* spp. Distribution (%) of MIC-values 2003 - Erythromycin

Compound	Number tested	Distribution (%) of MICs																					
		<=0,003	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	
Erythromycin																							
<i>Campylobacter jejuni</i>																							
Styria (Austria)	91						39,0	43,0	10,0	8,0	1,0												
	137						35,0		15,0	7,0	2,0												
Denmark	53							7,5	56,6	34,0	1,9												
	84							8,3	67,9	22,6	1,2												
	89							2,2	30,3	61,8	5,6												
The Netherlands	48							2,1	20,8	60,4	16,7												
Norway	108						1,9	8,3	52,8	34,3	2,8												
	31							16,1	74,2	9,7													
<i>Campylobacter coli</i>																							
Styria (Austria)	18							11,0	50,0	17,0	17,0	6,0											
	131							6,0	12,0	28,0	24,0	5,0	1,0										
	103							18,0	34,0	19,0	15,0	10,0											
Denmark	98							6,1	7,1	10,2	25,5	22,4	5,1										

Table AB 37. Test methods used for antibiotic resistance testing of *Escherichia coli* 2003

Standard used for testing	Test method	Country	used for	additional standards used	Is the testing procedure subject of quality control	further remarks
<i>Escherichia coli</i>						
NCCLS	Agar diffusion	Greece	² Animals		yes	Laboratory 2
		Greece	¹ Animals and food		no	Laboratory 1
		Latvia	⁰ Animals and food		yes	
		Province of Tuscany ²	Animals and food		yes	Tuscany and Lazio Regions
		Spain	⁰ Animals and food			
NCCLS	Agar diffusion	Italy	Cattle		yes	
NCCLS	Broth dilution	Denmark	⁰ Animals and food	Danmap 2003		
		Finland	⁰ Animals and food		yes	
		The Netherlands	⁰ Animals and food		yes	
Microbiological Breakpoints	Broth dilution	Norway	⁰ Animals and food		yes	
		Sweden	⁰ Animals and food		yes	
		n.a.	Spain	¹ Animals	VAV	
VLA	Agar diffusion	England and Wales	⁰ Animals and food		yes	BSAC/ Historical UK veterinary

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 38. Breakpoints used for antibiotic resistance testing of *Escherichia coli* for those antimicrobials where no NCCLS breakpoint is fixed 2003

Standard used	Country	Breakpoints (µg/ml)		Disk content (µg)	Zone diameter (mm)			
		susceptible <=	resistant >		susceptible >=	intermediate	resistant <=	
<i>Escherichia coli</i>								
Florfenicol	Denmark	0						
	Finland	0	16	16				
	The Netherlands	0	16	16				
	Spain	1	16	16				
	Sweden	0	16	16				
	Norway	0		16				
3rd gen. Cephalo	Province of Tuscany	2		30	23	15-22	14	
Streptomycin	Denmark	0						
	Finland	0	32	32				
	Sweden	0	32	32				
	Norway	0		16				
Neomycin	Finland	0	8	8				
	Greece	1			30	17	13-16	12
	The Netherlands	0	16	16				
	Latvia	0			30	16	13-16	12
	Spain	1	8	8				
	Sweden	0	8	8				
	Norway	0		4				
	England and Wales	0			10	13		13

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 39. Breakpoints used for antibiotic resistance testing of Escherichia coli - deviations from NCCLS-Standards 2003

Antimicrobial	Country	Breakpoints (µg/ml)		Disk content (µg)	Zone diameter (mm)			other Standard
		susceptible <=	resistant >		susceptible >=	intermediate	resistant <=	
Escherichia coli								
Ampicillin	Spain	0		10	15	12-14	11	
Cephalotin	Denmark	0	16					Danmap 2003
Cefotaxim	The Netherlands	0	1	1				
	Latvia	0		30	21	14-20	13	
3rd gen. Cephalosporin	Province of Tusc	2		30	23	15-22	14	
Ciprofloxacin	Denmark	0	0,06					Danmap 2003
Enrofloxacin	Greece	1		5	22	19-21	18	
	Italy			5	20	17-19	16	
	Province of Tusc	2		5	23	17-22	16	
Flumequine	The Netherlands	0	4	4				
Trimethoprim	Spain	0		5	20	17-19	16	
Sulfonamide	Spain	0		200	17	13-16	12	
Apramycin	Denmark	0	8					Danmap 2003
Spectinomycin	Denmark	0	64					Danmap 2003
Colistin	Denmark	0	8					Danmap 2003

Note: If a country is listed more than once, further specification is found under the subsequent columns. Indices 1, 2, 3 are shown in case more than one method is used or several laboratories are involved in reporting. Index 0 stands for one method only.

Table AB 40. Breakpoints used for antibiotic resistance testing of *Escherichia coli* with agar diffusion other than NCCLS 2003

Antimicrobial	Standard used	Country	Disk content (µg)	Zone diameter (mm)	
				susceptible >=	resistant <=
<i>Escherichia coli</i>					
Tetracyclin	VLA	England and Wales	10	13	13
Ampicillin	VLA	England and Wales	10	13	13
Enrofloxacin	VLA	England and Wales	5	13	13
Trimethoprim/Sulfonamide	VLA	England and Wales	25	13	13
Neomycin	VLA	England and Wales	10	13	13

Abbreviations:

VLA, Veterinary Laboratories Agency

Table AB 41. Antibiotic resistance testing of Escherichia coli in animals - Percentage of resistant isolates 2003

Monitoring		Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	STR	GEN	NEO	KAN	APR
Animals																							
Escherichia coli	YES	DK	541	22	4	0	18	4	4,0	9	24	3,0						27	0	4			
Escherichia coli	YES	E	442	88	31	2	63	33	10,4	65	69	0,0	0,0					67	7	15	15		
Escherichia coli	YES	FIN	356	1	0	0	1	1	0,0	0	2							0,0	5	0	0		
Escherichia coli	NO	EL	122	86	47	81	68	53,6	76	59	69						53,6	57	40	53	21		
Escherichia coli	-	EL	25	84	100	40,0	68										64,0		56	88			
Escherichia coli	YES	NL	320	64	12	0	39	18	1,5	45	45	1,5							2	7			
Escherichia coli	YES	S	303	12	1	0	3	1	0,6	4	9							0,0	10	0	1		
Escherichia coli	YES	N	238	3	0	0	2	0	0,0	0	5							0,0	7	0	0		
Escherichia coli	NO	LV	63	74	62	34	12,4	10									17,6	73	15	49	43		
Escherichia coli	-	LT	12	100	40,0	33	100,0												83				
Escherichia coli	YES	I (T, L)	259	49	20	36	16	9,9	25	35	1,2							37	5	15			

NOTE:

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Ceftiofur (TIO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 42. Antibiotic resistance testing of Escherichia coli - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR	
Escherichia coli																										
Cattle																										
YES	DK	86	4	1	0	2	0	0,0	2	4	4	1,0									4	0	2			
YES	FIN	356	1	0	0	1	1	0,0	0	2			0,0								5	0	0			
-	EL	25	84			100	40,0	68					64,0									56	88			
YES	N	120	5	1	0	3	0	0,0	0	10			0,0								13	0	1			
NO	LV	10	67			63	50	0,0	0				0,0								83	30	86	67		
YES	I (T, L)	122	56	29	46	24	16,0	25	43	2,0											48	8	24			
Beef																										
-	DK	161	7	1	0	5	0	0,0	2	4	4	4,0					0,0				7	0	1		1	
YES	E	96	59	17	37	31	7,0	40	29													6	12			
YES	NL	201	15	4	0	11	2	0,0	9	9		0,0										0	3			
YES	N	90	9	1	0	8	0	0,0	4	16			0,0								17	0	0		0	
Beef imported																										
-	DK	31	16	0	0	13	0	0,0	10	13		0,0					0,0				10	0	0		0	

NOTE:

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftriaxone (CAZ), Cefoperazone (CFP), Ceftiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 42. Antibiotic resistance testing of Escherichia coli - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Pigs																											
YES	DK	317	31	7	0	23	2	2,0	14	31	4,0										44	0	6				
YES	E	285	93	38	2	68	14	1,1	77	78			0,0	0,0							72	5	14	13			
NO	EL	7	100	100		86	0	28,3	100	100						100,0					100	86	100	0			
YES	NL	155	69	8	1	28	0	0,0	43	44		0,6										1	3				
YES	S	303	12	1	0	3	1	0,6	4	9						0,0					10	0	1				
NO	LV	31	87			68	39	18,0								67,0					89	14	55	62			
-	LT	12				100		40,0	33	100,0												83					
YES	I (T, L)	37	68	30	51	14	3,0	51		53	0,0										54	2		13			
Pork																											
YES	DK	123	22	4	0	15	2	2,0	13	21	6,0					0,0					24	0	4				
YES	E	56	68	14		52	32	4,0	37	45												3	70				
YES	NL	29	21	3	0	14	0	0,0	21	24	0,0											0	3				
Poultry																											
YES	DK	138	14	0	0	15	10	11,0	1	20	2,0										4	0	2				
YES	E	157	79	20	2	54	67	27,4	43	53			0,0	0,0							56	9	19	19			
NO	EL	90	92	50		81	80	61,7	82	70	85										67	48	44	27			
YES	NL	165	60	16	0	50	35	3,0	46	46	2,4											3	12				
NO	LV	3	33			67	33	0,0								0,0					67	0	0	33			
YES	I (T, L)	29	45	4	14	7	0,0	14		14	0,0										14	0		5			

NOTE:

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)

YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftazidime (CAZ), Cefoperazone (CFP), Ceftiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 42. Antibiotic resistance testing of Escherichia coli - Percentage of resistant isolates 2003

Monitoring	Country	Invest.	TET	CHL	FLR	AMP	NAL	FQ	SXT	TMP	SU	CE	CEP	CTX	CAZ	CFP	TIO	CXM	CQN	CRO	STR	GEN	NEO	KAN	APR		
Poultry meat																											
-	DK	153	9	1	0	10	10	0,0	6	14	2,0	0,0	0,0	8	0	1	1										
YES	E	50	85	10	68	42	10,0	20	37					15	5	0											
NO	EL	1	0	0	0	0	0,0	0	0	100				100	0	0											
YES	NL	361	47	10	1	50	29	2,5	39	40	4,4			3	2												
Poultry meat imported																											
-	DK	22	59	9	0	18	5	0,0	9	14	0,0	0,0	0,0	18	0	0											
Other animals																											
NO	EL	25	60	0	80	0	31,7	48	0	0			41,0	0	20	73	0										
YES	N	118	0	0	1	0	0,0	0	1				0,0	2	0	0											
NO	LV	21	60		46	18		11				0,0	0,0	39	10	32	21										
YES	I (T, L)	71	27	6	20	8	7,0	17	23	1,0				20	3	5											
Humans																											
-	DK	107	15	3	0	21	1	1,0	7	21	2,0	0,0	0,0	20	0	1											

Note:

Source for the Danish data: Danish Institute of Food and Veterinary Research (cited in DANMAP 2003)
 YES - Isolates collected within a monitoring programme; NO - Isolates collected not within a monitoring programme; - no information on the source of the isolates available
 Tetracycline (TET), Chloramphenicol (CHL), Florfenicol (FLR), Ampicillin (AMP), Nalidixic acid or other quinolone (NAL), Fluoroquinolone (Ciprofloxacin or Enrofloxacin) (FQ) Sulfonamide /Trimethoprim (SXT), Trimethoprim (TMP), Sulfonamides (SU), 3rd gen.Cephalosporin not further specified (CE), Cephalotin (CEP), Cefotaxim (CTX), Ceftriaxone (CAZ), Cefoperazone (CFP), Ceftiofur (TIO), Cefuroxime (CXM), Cefquinome (CQN), Ceftriaxone (CRO), Streptomycin (STR), Gentamicin (GEN), Neomycin (NEO), Kanamycin (KAN), Apramycin (APR)

Table AB 45 Antimicrobial resistance in *Escherichia coli* Distribution (%) of MIC-values 2003 - Ampicillin and Amoxicillin/clavulanate

Compound	Number tested	Distribution (%) of MICs																						
		≤0,003	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Ampicillin																								
Denmark	86								3,5	34,9	57,0	2,3												
	192								34,4	45,3	13,5	0,5												
	317								6,9	43,2	24,6	2,2	0,3											
	123								30,1	43,1	11,4	0,8												
	138								15,9	51,4	15,9	1,4	0,7											
	175								46,9	34,9	6,9													
	107								5,6	38,3	34,6	0,9												
	285								1,4	7,4	17,2	5,3	0,4											
	157								3,2	11,5	26,1	5,7												
	356								6,2	47,2	43,0	1,4	0,6											
	155								1,3	22,6	41,3	5,8												
	165								1,2	13,9	32,7	2,4												
	303								6,6	68,0	21,5	0,7												
	120								8,3	71,7	17,5													
	90								8,9	65,6	17,8													
	118								31,4	58,5	9,3													
Amoxicillin/clavulanate																								
Denmark	86									20,9	72,1	7,0												
	192									69,3	27,6	2,6	0,5											
	317									34,1	41,0	22,7	1,9	0,3										
	123									61,8	29,3	6,5	1,6	0,8										
	138									59,4	24,6	15,2	0,7											
	175									75,4	18,9	5,7												
	107									20,6	53,3	20,6	5,6											

Table AB 46 Antimicrobial resistance in *Escherichia coli* Distribution (%) of MIC-values 2003 - Nalidixic acid

Compound	Number tested	Distribution (%) of MICs																							
		≤0,003	0,007	0,015	0,03	0,06	0,12	0,25	0,5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048			
Nalidixic acid																									
Denmark																									
Cattle	86																								
Beef	192																								
Pigs	317																								
Pork	123																								
Poultry (<i>G.gallus</i>)	138																								
Poultry meat	175																								
Healthy Humans	107																								
Spain																									
Pigs	285																								
Poultry	157																								
Cattle	356																								
Pigs	303																								
Cattle	120																								
Beef	90																								
Sheep	118																								
Flumequine																									
The Netherlands																									
Pigs	155																								
Poultry	165																								

