SCIENTIFIC REPORT

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The European Union Summary Report on Antimicrobial Resistance in zoonotic and indicator bacteria from humans, animals and food in 2017/2018

European Food Safety Authority and
European Centre for Disease Prevention and Control

Abstract

Data on antimicrobial resistance (AMR) in zoonotic and indicator bacteria from humans, animals and food are collected annually by the EU Member States (MSs), jointly analysed by EFSA and ECDC and reported in a yearly EU Summary Report. The annual monitoring of AMR in animals and food within the EU is targeted at selected animal species corresponding to the reporting year. The 2017 monitoring specifically focussed on pigs and calves under 1 year of age, as well as their derived carcases/meat, while the monitoring performed in 2018 specifically focussed on poultry and their derived carcases/meat. Monitoring and reporting of AMR in 2017/2018 included data regarding *Salmonella*, *Campylobacter* and indicator *Escherichia coli* isolates, as well as data obtained from the specific monitoring of ESBL-/AmpC-/carbapenemase-producing *E. coli* isolates. Additionally, some MSs reported voluntary data on the occurrence of meticillin-resistant *Staphylococcus aureus* in animals and food, with some countries also providing data on antimicrobial susceptibility. This report provides, for the first time, an overview of the main findings of the 2017/2018 harmonised AMR monitoring in the main food-producing animal populations monitored, in related carcase/meat samples and in humans. Where available, data monitoring obtained from pigs, calves/cattle, broilers, laying hens and turkeys, as well as from carcase/meat samples and humans were combined and compared at the EU level, with particular emphasis on multiple drug resistance, complete susceptibility and combined resistance patterns to critically important antimicrobials, as well as *Salmonella* and *E. coli* isolates exhibiting presumptive ESBL-/AmpC-/carbapenemase-producing phenotypes. The outcome indicators for AMR in food-producing animals, such as complete susceptibility to the harmonised panel of antimicrobials in *E. coli* and the prevalence of ESBL-/AmpC-producing *E. coli* have been also specifically analysed over the period 2014–2018.

Keywords: antimicrobial resistance, zoonotic bacteria, indicator bacteria, ESBL, MRSA

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Summary

In **2017–2018**, data on antimicrobial resistance (AMR) in zoonotic and indicator bacteria, submitted by 28 EU Member States (MSs), were jointly analysed by the European Food Safety Authority (EFSA) and the European Centre for Disease Prevention and Control (ECDC). Resistance in zoonotic *Salmonella* and *Campylobacter* from humans, animals and food, as well as resistance in indicator *Escherichia coli* and meticillin-resistant *Staphylococcus aureus* (MRSA) from animals and food were addressed. 'Microbiological' resistance was assessed using epidemiological cut-off (ECOFF) values; for some countries, qualitative data on human isolates were interpreted in a way which corresponds closely to the ECOFF-defined 'microbiological' resistance.

In *Salmonella* spp. from human cases in 2018, resistance to ampicillin, sulfonamides and tetracyclines were observed at overall high levels, particularly among serovars commonly found in pigs, while resistance to third-generation cephalosporins were noted at overall very low/low levels. A decline in resistance to ampicillin and tetracyclines in *Salmonella* Typhimurium from humans was observed in several countries over the period 2013–2018. In *Salmonella* spp. and indicator *E. coli* isolates recovered from animals and food during the 2017/2018 routine monitoring, resistance to ampicillin, tetracyclines and sulfonamides was also frequently detected, and resistance to third-generation cephalosporins was uncommon; paralleling that observed in *Salmonella* isolates reported from human cases. Additionally, in 2018, resistance to (fluoro)/quinolones was observed at very high/high levels among *Salmonella* spp. and indicator *E. coli* isolates recovered from broilers, fattening turkeys and poultry carcases/meat, and at high to extremely high levels in *Salmonella* isolates from humans in serovars commonly found in poultry (namely Infantis and Kentucky), with increasing levels of resistance over time.

The monitoring included assessment of the levels of presumptive extended-spectrum beta-lactamase (ESBL)-/AmpC-/carbapenemase producers among *Salmonella* spp. from human cases, food-producing animals and animal carcases; as well as among indicator *E. coli* isolates from food-producing animals. At the reporting MS-group level, the proportion of presumptive ESBL or AmpC producers was low among all indicator *E. coli* isolates recovered from the animal sector (fattening pigs, calves, broilers and fattening turkeys) and very low to low among *Salmonella* spp. recovered from animals/carcases (fattening pigs, broilers, laying hens and fattening turkeys) and from human cases, although higher in some *Salmonella* serovars. Within both the routine and specific monitoring (non-selective and selective media, respectively), varying occurrence/prevalence rates of presumptive ESBL or AmpC producers were observed in different reporting countries. Carbapenemase-producing *E. coli* was detected in a single sample from a fattening pig in one MS in 2017; while no presumptive or confirmed carbapenemase-producing *E. coli* was detected from broilers and their derived meat in 2018. Carbapenemase-producing *Salmonella* were reported in one domestically-acquired case and four human cases lacking information on travel status in 2018.

Resistance to colistin was generally uncommon among *Salmonella* spp. and *E. coli* isolates recovered from food-producing animals (fattening pigs, calves/cattle, *Gallus gallus* and fattening turkeys) and carcases/meat derived from these animals.

In *Campylobacter* from humans, food-producing animals and poultry meat, resistance to ciprofloxacin and tetracycline generally ranged from high to extremely high, particularly in *Campylobacter coli* isolates from humans and from poultry and derived meat. Erythromycin resistance was observed at much lower levels in *Campylobacter jejuni* but at moderate levels in *C. coli* isolates from pigs and humans. Ciprofloxacin and tetracycline resistance increased over time in both *C. jejuni* and *C. coli* from humans in several countries, while erythromycin resistance was more commonly decreasing in *C. jejuni*. In five countries, high to very high proportions of *C. coli* from humans were resistant to both ciprofloxacin and erythromycin, leaving few options for treatment of severe *Campylobacter* infections.

Combined resistance to critically important antimicrobials in *Salmonella*, *C. jejuni* and *E. coli* from both humans and animals was generally uncommon, although very high to extremely high multiple drug resistance levels to other antimicrobials were observed in certain *Salmonella* serovars. Notably, *S.* Infantis accounted for most of the multiple drug resistant *Salmonella* spp. recovered from broilers and their derived carcases (79% and 75.3%, respectively), and monophasic *S.* Typhimurium accounted for 52.3% and 56.7% of the multiple drug-resistant *Salmonella* spp. recovered from fattening pigs and their derived carcases, respectively. Furthermore, *S.* Kentucky accounted for most of the *Salmonella* isolates from both humans and poultry, which exhibited high-level resistance to ciprofloxacin (140/180

and 180/252 isolates, respectively), in addition to the detection of third-generation cephalosporin resistance in some isolates.

The voluntary monitoring of MRSA from food, healthy animals and following clinical investigations in 2017/2018 revealed that most reported *spa*-types were those associated with LA-MRSA lineages in both reporting years (94.9% in 2017 and 97.6% in 2018). *Spa*-types associated with community-associated (CA)- and healthcare-associated (HA)-MRSA were also reported, as well as *mecC*-MRSA. The occasional detection of lineages of CA- and HA-MRSA primarily associated with humans is presumably associated with the sporadic interchange of strains between humans and animals.

The outcome indicators for AMR in food-producing animals, such as complete susceptibility to the harmonised panel of antimicrobials in *E. coli* and the prevalence of ESBL-/AmpC-producing *E. coli*, have also been specifically analysed over the period 2014–2018. There are marked variations in both outcome indicators among reporting countries. A positive development manifested by statistically significant decreasing trends in the prevalence of ESBL-/AmpC-producing *E. coli* in food-producing animals is observed in 12 countries (11 MSs and 1 non-MS), whereas statistically significant increasing trends in complete susceptibility in indicator *E. coli* from food-producing animals is registered in 6 MSs. These outcome indicators show that some encouraging progress has been registered in reducing AMR in food-producing animals in several EU MSs over the last years.