

Summary MARAN 2024

Antimicrobial resistance

In 2023, 1413 human *Salmonella* isolates and 726 isolates from non-human sources were tested for antimicrobial susceptibility. Over all isolates, the highest resistance proportions were observed for ciprofloxacin (21%), nalidixic acid (21%), ampicillin (18%), sulfamethoxazole (19%), tetracycline (17%), trimethoprim (9%) and chloramphenicol (6%). Over all sources, the highest levels of resistance were observed for monophasic *S. Typhimurium*, *S. Infantis*, *S. Chester*, *S. Paratyphi B* var. Java, and *S. Typhimurium*. One carbapenemase-producing *Salmonella* (OXA-48) was found in a human isolate (monophasic *S. Typhimurium*). Among human *S. Typhimurium* isolates, decreasing trends in resistance against ampicillin (34%) and tetracycline (18%) were observed since 2010. Among human *S. Enteritidis* isolates, a decrease in resistance against ampicillin (10%), ciprofloxacin and nalidixic acid (27%) was observed. However, in general there is an increasing trend in resistance against fluoroquinolones in human isolates since 2010. In total, 20 (1.4%) ESBL-producing human clinical isolates were detected, which is comparable to previous years (1.8% in 2022 and 1.4% in 2021). Levels of resistance among isolates from broiler meat were high for ciprofloxacin (52%), nalidixic acid (52%), tetracycline (33%) and sulfamethoxazole (68%).

In 2023, resistance proportions in *C. jejuni* isolates from caecal samples of broilers and meat thereof remained at a high level for fluoroquinolones (FQ) and tetracycline. Resistance to erythromycin was not detected in *C. jejuni* isolates from broilers and poultry meat, but was observed at low levels in *C. jejuni* from veal calves and *C. coli* from broilers and poultry meat. A notably higher level of erythromycin resistance was observed in *C. coli* from veal calves again. In humans, resistance proportions were higher in *C. coli* than in *C. jejuni* isolates. Resistance levels increased in 2022 and 2023 compared with 2020 and 2021, when resistance most likely dropped due to a substantial reduction of travel-related campylobacteriosis as a result of the COVID-19 travel restrictions, which is associated with higher resistance proportions than domestically acquired campylobacteriosis. However, resistance levels for *C. jejuni* were generally still lower than before the COVID-19 pandemic, but back to pre-pandemic levels for *C. coli*. Ciprofloxacin resistance in *Campylobacter* isolates from humans was high again in 2023, which is a concern for public health. It was, however, lower compared to 2019, before the COVID-19 pandemic. Resistance to erythromycin, first choice antibiotic in human medicine for campylobacteriosis, remained low.

In Shiga-toxin producing and Enteropathogenic *E. coli* serotype O157 (STEC/EPEC O157), a decrease in proportions of resistance against ampicillin, tetracycline, trimethoprim and sulfamethoxazole compared to 2022 was observed. The proportion of resistance of ciprofloxacin was higher in human STEC/EPEC non-O157 *E. coli* than in human STEC O157. No ESBL-producing isolates were detected in STEC O157, but resistance to third generation cephalosporins was detected in three STEC/EPEC non-O157 *E. coli* isolates through presence of ESBL genes in two isolates (CTX-M-1 and CTX-M-15). In a third isolate, a mutation in the AmpC promotor region was detected.

Amongst indicator *E. coli* obtained from caecal samples of broilers, pigs and veal calves, the levels of resistance stabilised for most antibiotics in the last five years. Resistance in *E. coli* from faecal samples of dairy cattle remained traditionally low. Proportions of resistance to ampicillin, tetracycline, sulfamethoxazole and trimethoprim remained relatively high in broilers, pigs, and (white) veal calves. Resistance to fluoroquinolones was still commonly present in indicator *E. coli* from caecal samples of broilers (25.6%) in contrast to the low prevalence observed in pigs (1,7%) and veal calves (4.3%) and

the complete absence in dairy cattle. In addition, resistance to third generation cephalosporins was low or absent amongst (randomly isolated) indicator *E. coli* in all animal species. For most antibiotics tested, levels of resistance in *E. coli* from caecal samples of rosé veal calves were substantially lower than those from white veal calves. In *E. coli* isolates from chicken meat, decreasing levels of resistance were observed with a tendency to flatten in the more recent years. Except for the lower FQ resistance in retail pork, resistance patterns in *E. coli* obtained from pork were comparable to broiler meat with the highest resistances monitored for ampicillin, trimethoprim, sulfamethoxazole and tetracycline. Over time, no major changes occurred in *E. coli* from pork. In bovine meat, levels of resistance are traditionally low with fluctuating percentages below 5% for most antimicrobials tested. In addition, *E. coli* obtained from imported beef showed similar low levels of resistance.

The prevalence of resistance to extended-spectrum cephalosporins (ESC) in randomly selected *E. coli* has been steadily low for several years in all livestock species. In contrast, selective culturing revealed an increase of ESC resistance in dairy cattle and broilers in recent years. In dairy cattle, the prevalence of selectively isolated ESC-resistant *E. coli* significantly increased over the past 5 years from 10.3% in 2019 to 18.0% in 2023. A significant increase in the prevalence of selectively isolated ESC-resistant *E. coli* was also observed in broilers over the past 4 years from 10.2% in 2020 to 20.3% in 2023. However, the increase in broilers is partially attributed to a change in the sampling method from 2022 onwards in accordance with the updated European legislation (Commission Implementing Decision (EU) 2020/1729). As in former years, Whole Genome Sequencing of ESC-resistant *E. coli* shows that genetic clustering is mostly seen within production sectors, although some spill-over appears to occur.

In 2023, the prevalence of the colistin resistance gene *mcr* was low in livestock and meat. No carbapenemase-producing *Enterobacteriaceae* were detected in samples from livestock, companion animals and meat. In 2023, 4.5% of the investigated sheep farms was tested positive for MRSA.

The level of resistance of indicator *E. coli* from livestock and meat further stabilised in 2023. An unexpected increase of ESC resistance was observed in dairy cattle. In spite of the long-term AMU reduction, continuous high levels of resistance are observed for fluoroquinolones and tetracycline in *Campylobacter* isolates from humans and poultry. Colistin-resistance remains present at low levels, while no CPE was detected in samples from livestock, companion animals or meat.

Namens alle coauteurs van hoofdstuk 3 en 4 van MARAN 2024,

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