1. Editorial

2024, as the year is nearing its end, the world stands between hope and challenge in regards to implementing the changes and actions needed to preventing, managing and controlling antimicrobial resistance (AMR) to which the United Nations members committed themselves at the UN General Assembly in New York in September.

Denmark, with its long-standing tradition of high-quality diagnostics, robust health data systems and effective public health responses, is well-positioned to endorse some of the agreed actions. Denmark also has strong experience in working across the human and animal sectors in an integrating One Health approach, which offers a unique opportunity to support both national and global efforts against AMR. Finally, Denmark is characterized by flat hierarchical structures and a strong collaborative spirit in the planning, coordination and response to possible AMR threats.

2023, the year of the data collected and presented in this DANMAP report, seems to be an equally important year. While 2022 was a year pulling out of the COVID-19 pandemic, having to enforce, strengthen and reorganize much of health care systems and work, 2023 saw proof of the former years investigations into antibiotic stewardship and infection prevention and control programs. Although nothing seems to be fully back to normal yet, the trends in the report start picking up at where we left in 2019. An example are continued efforts at long-term care facilities in working with better prevention of infections in the elderly, which are demonstrated by a reduced antibiotic usage and fewer infections than in former years. Another example is the continued reductions in use of the antibiotics of "special critical interest", cephalosporins and fluoroquinolones, at hospitals.

But not everything is solely positive, as demonstrated by a higher use of antibiotics in practically all other age groups than the elderly, continuously increasing use of piperacillin-tazobactam at hospitals, or the backlash in resistance in *E. coli* and *K. pneumoniae* in clinical samples after years of overall decreasing trends. 2023 also found an increase in the number of outbreaks with Carbapenemase-producing Enterobacterales at Danish hospitals, which demands increased screening, cleaning and other preventive efforts.

The veterinary side also saw interesting changes in 2023, which should not be left unnoticed. Following the ban of zinc oxide in the pig production from June 2022, increases were observed in usage of antimicrobials in weaners, leading to marked increases for aminoglycosides, particularly neomycin and apramycin, and a seemingly direct association to observed increasing resistance levels to the different types of aminoglycosides, particularly neomycin and gentamicin, in haemolytic *E. coli* and *Salmonella enterica* recovered from pigs.

It remains positive that no clear association could be found in analyses investigating the dispersion of resistance genes (Extended spectrum beta-lactamases, ESBL) and sequence types among bacterial strains of *E. coli* from invasive cases in humans and healthy animals, which points towards only little if any direct transmission between the examined populations. However, further genomic analysis of the isolate collection has identified some ESBL genes with probable zoonotic links, which calls for further research.

In conclusion, in 2023 Denmark continued overall low trends of resistance in bacterial strains, and a comparably low usage of antimicrobials in both the veterinary and human sector, but this should not be misinterpreted as "nothing needs to be done". Continuously low levels of antibiotic resistance demand continuous efforts in prevention and rational antibiotic use. High output of pigs produced demands high and sustained input of initiatives ensuring animal health and biosecurity. Movements of goods and people across countries with varying levels of AMR demand attention and screening efforts.

All countries are now – again – encouraged to work with national action plans in a One Health approach. The Danish Veterinary and Food Administration recently published their newest version, the human side is in a consultation process regarding theirs. What is left to do is to renew the Danish One Health AMR Strategy, the overarching umbrella needed upon all efforts.

The DANMAP team

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