

1. Editorial

In 2024, the UN General Assembly called for joining forces and increasing efforts in combatting antimicrobial resistance (AMR) worldwide. World leaders understood that AMR is not only one of the biggest threats to public health and economy, it is also a problem that needs to be addressed and tackled in a cross-sectoral approach - between human health, animal health and the environmental sector. In particular, it was understood that it was time to move from knowledge-gathering to implementation.

In Denmark, the Danish Veterinary and Food Administration unveiled its third National Action Plan Against AMR in Animals and Food in September 2024. The plan aligns with international frameworks such as the WHO's Global Action Plan and the EU's One Health Strategy, while also responding to Denmark's own political agreements, including the 2024 Food and Veterinary Agreement.

The action plan builds on continuing efforts from former action plans from 2017 and 2021. It is structured around four strategic pillars and describes 22 concrete actions. First, it aims at strengthening surveillance of AMR in food production systems by continued integration of whole genome sequencing (WGS), supporting evidence-based decision-making in the veterinary sector. Second, it continues promoting responsible antibiotic use in livestock through regulatory refinement, enhanced veterinary supervision, and incentives for reduced consumption. Third, it advances targeted communication strategies to support informed choices among veterinarians and producers, including updated treatment guidelines and public information campaigns. Finally, it prioritizes national and international collaboration, among these Denmark's participation in Nordic and EU joint actions and research activities, and the fostering of cross-sectoral coordination and science implementation, on a global scale.

In June 2025, the Danish Ministry of the Interior and Health published its second national action plan for the fight of antimicrobial resistance in humans. The action plan provides a broad framework for the Danish efforts to promote rational use of antimicrobials and to prevent antimicrobial resistance within four focus areas: (1) fighting and reducing AMR, (2) better access to antimicrobials, (3) infection prevention and control and (4) international engagement. For each area, overarching political objectives and monitoring indicators are set to track progress towards the objectives. In total, 21 initiatives are suggested as concrete steps to work with the action in practice. The new action plan shifts to focus on positive progress measured by specific indicators rather than reaching pre-defined goals. The ambition is to promote sustainable change that ultimately will strengthen rational use of antimicrobials and combat antimicrobial resistance in the long term.

Both action plans address the need for joint actions and call for the development of a new national One Health AMR strategy.

From the technical level, a wish for a cross-spanning committee to cover and follow One Health actions has been uttered but not yet fulfilled.

Denmark is fortunate in many ways. The political system is built on mutual trust and close collaboration between politicians, policy makers, and executors. The health care system is characterized by short distance to high quality treatment. The surveillance is based on long-standing registers and robust data infrastructure. Despite this and close to 30 years of surveillance, DANMAP 2024 detects and presents areas that need increased focus and awareness such as the recent development and changes in antibiotic usage in pig production and the continued high usage of combination penicillins in humans with a simultaneous rise in resistance towards piperacillin-tazobactam in the monitored invasive bacterial species.

The DANMAP monitoring programme plays a pivotal role in operationalizing the strategic pillars from both action plans. By expanding the reporting of WGS results in recent years, DANMAP has enhanced its surveillance infrastructure and supports evidence-based risk assessment. The broadened scope to expand surveillance on AMR in animal pathogens and report antimicrobial use at the active compound level and in specific subgroups provides granular insights essential for regulatory refinement and targeted interventions. DANMAP also tracks antibiotic use trends in relation to specific reduction targets and evaluates the impact of implemented control measures, thereby informing policy and practice. Furthermore, its data and expertise contribute to awareness campaigns and the development of updated treatment guidelines, reinforcing informed decision-making among prescribers and producers. Internationally, DANMAP's participation in EU, Nordic, DANIDA and Strategic Sector Collaboration (SSC) AMR-related projects, along with its integration into national intersectoral coordination mechanisms, ensures that Denmark's efforts are both globally aligned and domestically coherent, advancing the One Health agenda through collaborative, data-driven action.

Despite the efforts DANMAP has not been able to monitor antibiotic usage at production site or patient level, a necessity if the impact and results from antimicrobial stewardship-programmes are to be followed and evaluated. It should also be questioned if DANMAP properly detects and describes AMR levels in healthy individuals or in certain population groups such as inhabitants of nursing homes. On the food production side there is a wish for following development of AMR in diseased animals more closely than today.

Next year DANMAP will celebrate its 30th birthday. There is much to be proud of, but also plenty to do. Let's keep it this way!

The DANMAP team

Textbox 1.1

National action plan on antimicrobial resistance in humans

Minister's foreword

Antimicrobials are essential for the functioning of modern healthcare systems. They allow us to treat commonly occurring infections, perform essential medical procedures and utilize advanced therapies. The emergence of antimicrobial resistance therefore poses a threat to modern healthcare.

Concerted day-to-day efforts by healthcare professionals have successfully reduced the consumption of antibiotics in Denmark. Their work has been supported by national initiatives such as DANMAP, strengthened infectious disease surveillance and preparedness in accordance with the recommendations in the *Joint action plan on antibiotics and resistance* from 2010. In 2017, three goals for antimicrobial consumption followed in the *National action plan for antibiotics for humans*. Yet, resistance rates are rising, nationally and in particular globally. Antimicrobial shortages are increasingly frequent. The situation calls for action and political leadership to curb this worrying development.

Therefore, I am proud to have presented a new Danish *National action plan on antimicrobial resistance in humans* in June 2025. The action plan is the result of an agreement between the Danish Government and all parties of the Danish parliament underlining a broad political commitment to combatting antimicrobial resistance in Denmark and allocating a total of DKK 130 million from 2025-2028 to AMR initiatives.

The national action plan broadens the scope of Danish efforts to combat antimicrobial resistance in humans by strengthening four central priority areas: (1) antimicrobial stewardship, (2) access to antimicrobials, (3) infection prevention and control and (4) international engagement. Each priority area contains an overarching political objective and a number of underlying indicators to monitor overall progress towards reaching the political objective. In total, 21 initiatives provide concrete steps to achieving the political objective of ultimately contributing to combatting the development and spread of antimicrobial resistance.

Sophie Løhde,
Minister of the Interior and Health

Antimicrobial stewardship

Inappropriate use of antimicrobial drugs is a key driver of antimicrobial resistance. Reducing and rationalizing our consumption of antimicrobials must therefore be an integrated part of any effort to hinder the development of antimicrobial resistance. We therefore commit to reducing the use of antimicrobials and prioritising antimicrobials associated with a lower risk of resistance development by:

- 1) Strengthening cooperation on infection prevention and control and the rational use of antibiotics between hospitals and municipalities, general practitioners and practising specialists.
- 2) Strengthening diagnostics through a research-based pilot project developed in a public-private partnership to generate knowledge on how rapid point-of-care diagnostics can be implemented in primary care.
- 3) Assessing the need for prescription requirements for topical antimicrobials currently available over the counter to promote rational use.
- 4) Adjusting the packaging of antimicrobials to ensure greater alignment with treatment guidelines and updated package leaflets.
- 5) Improving quality in general practice through a cluster package on the rational use of antimicrobials for within clusters practice.

Access to antimicrobials

Measures to ensure antimicrobial stewardship necessitates access to the appropriate antimicrobials. Limited availability and shortages may lead clinicians to resort to less suitable alternatives and hinder the proliferation of stewardship efforts. We therefore commit to working to ensure a more stable and improved supply of antimicrobials by:

- 6) Exploring the potential for participating in an innovative joint European procurement model to safeguard access to essential antibiotics.
- 7) Strengthening Nordic cooperation on the development of a joint procurement model to improve the availability of narrow-spectrum antibiotics that are particularly used in Denmark and the rest of the Nordic region.
- 8) Exempting antimicrobials from annual fees to the Danish Medicines Agency to remove unnecessary barriers to marketing and keep antimicrobials on the market in Denmark.

Infection prevention and control

Preventing infections reduces the underlying need to prescribe antimicrobials, thereby slowing the development of antimicrobial resistance. We already know that vaccines and basic hygiene are cost-effective infection prevention and control measures. We therefore commit to combating any upward trend and working towards a reduction in the level of infections requiring treatment by:

- 9) Strengthening training in hygiene and infection prevention and control by developing new educational materials on hygiene and infection prevention
- 10) Conducting a Health Technology Assessment (HTA) of pneumococcal vaccination to provide a well-founded basis for decisions on a potential public vaccination programme.
- 11) Introducing antimicrobial resistance as a parameter in the Danish Health Authority's future professional assessments of vaccine effectiveness
- 12) Simplifying guidance materials to streamline and support staff in their infection prevention and control efforts
- 13) Improving general practitioners' access to the Danish Vaccination Register (DDV) to enhance citizens' access to vaccines with conditional reimbursement.

International engagement

The fight against antimicrobial is a global issue. The movement of people and goods contribute to cross-border spread of antimicrobial resistance. Denmark have extensive experience in fighting antimicrobial resistance. We therefore commit to strengthening Denmark's international engagement and contribution to global efforts against antimicrobial resistance by:

- 14) Actively applying Danish knowledge and experience to support initiatives to combat AMR in both bilateral and multilateral partnerships.
- 15) Appointing a *High-Level Representative* to promote Danish solutions, participate in international forums and influence the global AMR agenda.
- 16) Providing financial support to the International Centre for Antimicrobial Resistance (ICARS) to sustain its ongoing work with low- and middle- income countries in developing evidence-based and sustainable AMR solutions adapted to local contexts.
- 17) Supporting the scaling up of the DTU National Food Institute's engagement as a WHO Collaborating Centre to strengthen Danish research-based advisory capacity and global capacity building.

In addition to the four priority areas, the action plan includes a number of cross-cutting initiatives aimed at supporting the national action plan's overall objective of combatting antimicrobial resistance by:

- 18) Establishing a national AMR advisory group where stakeholders involved in the implementation of the action plan can meet and exchange experiences to support broad societal anchoring.
- 19) Continuously monitoring the objectives of the action plan to provide the necessary knowledge base for future decision-making in the AMR area.
- 20) Promoting further research in AMR to generate new knowledge that can form an important foundation for future efforts to combat anti-microbial resistance.
- 21) Designing awareness and information campaigns on AMR targeting both the public and healthcare professionals.

For further information: sum@sum.dk

Textbox 1.2

National action plan against antimicrobial resistance in animals and food 2024-2027

In September 2024, a new national action plan against antimicrobial resistance (AMR) in animals and food was launched by the Danish Veterinary and Food Administration (DVFA). This is the third national action plan from the DVFA and it continues the efforts against AMR in the period 2024-2027. The vision for the action plan is to prevent the occurrence of resistant micro-organisms in animals and food in order to ensure effective treatment of microbial infections in humans and animals. This will be facilitated by a number of initiatives, under four focus areas:

- Strengthened Monitoring with a One Health Perspective
- Healthy Livestock with a Prudent and Low Consumption of Antibiotics
- Targeted Communication in order to Contribute to Informed Choices
- National and International Cooperation as High Priorities

The initiatives relate to antimicrobial consumption, antimicrobial resistance, and biosecurity:

The DVFA will continue to monitor antimicrobial use in animals and resistance in food and animals with a continuous focus on ensuring data of high quality. This will include implementation of new requirements by the EU, to report the use of antimicrobial medicines for animals at species level (Textbox 4.1).

Good biosecurity is important to keep livestock healthy. The DVFA has launched a project on biosecurity, which, amongst other things, will go through legislation in the area and make knowledge more accessible to the public.

In accordance with the Food and Veterinary Agreement, the action plan aims to support reducing the consumption of antibiotics in pigs, by 2027, to a politically agreed target of an 8% reduction based on the 2018 level.

A new focus area in the action plan is targeted communication. One of the first initiatives will be to improve and consolidate information about AMR on the DVFA website.

The DVFA continues to share experiences with other authorities and organisations, while also learning from other countries that have found good solutions in the fight against AMR. This is done through active participation in international forums on AMR.

The full list of initiatives can be found in the official National Action plan, which is available at the DVFA website (www.fvst.dk).

*The joint AMR group at the Danish Veterinary and Food Administration
For further information: 15@fvst.dk*

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