The EFFORT of ZonMw

Covering the entire spectrum of AMR research, from science to policy and through a One Health approach, is what ZonMw strives for.

In the Antibiotic Awareness Week 2018 ZonMw was one of the organisers of the conference ‘Antibiotic resistance: From science to practice and policy. What does this imply for you!?’ With this science-to-policy mindset, together with a One Health Approach, ZonMw finances many projects studying AMR in the food chain. This factsheet will provide a quick overview of essential and promising projects, related to livestock, that set out to reduce the global AMR problem.

Antibiotic prescription behaviour in the veterinary sector

In livestock farming antibiotics are used in high quantities, enhancing the development of antibiotic resistance. Therefore, several projects set out to investigate and understand the reasons behind this prescription behaviour with the aim to reduce antibiotic use. A Utrecht University study found that veterinary advices were not always followed. For example because executing the advice is too laborious and expensive, due to risk-aversive behaviour, or because the importance of the advice did not come across. The project investigated what the added value of good cooperation – between farmers, veterinarians, and feed advisors - could be. The result was a positively influenced implementation of the advices and antibiotic use.

Linking to this project, VET-ENHANCE is currently investigating to what extent guidelines on antibiotic use in the veterinary sector are actually implemented and how this implementation could be improved.

Alternative ways to reduce antibiotic use in animals

Besides antibiotic prescription behavior, several studies are investigating alternative ways to reduce the current extensive use of antibiotics in animals. One project, focusing on the farm environment in the Netherlands, is investigating the activities in farm management and the level of biosecurity and immunisation coverage that are needed to reduce antibiotic use in chickens, calves, and pigs.
The completed ASAP project focused on companion animals and whether a guided approach will lead to more precatious use of antibiotics in companion animal practices. The researchers developed an Antimicrobial Stewardship Programme, consisting of extra training, an information folder for animal owners, and individual feedback for the practice. As these activities resulted in a significant reduction of antibiotic use, additional advice will be developed for implementation on a bigger scale.

The Pig Nose controlling MRSA
A Utrecht University project is investigating whether bacteria that naturally occur in the pig nose can control the growth of MRSA by using high-tech molecular techniques. With a multidisciplinary approach, doctors, researchers, veterinarians, and farmers are collaborating to limit the transmission of MRSA from pigs to humans. Along this line, an JPIAMR international study is similarly studying which bacteria in the pig nose can control MRSA and through which mechanisms. In a later stage, field tests will be performed in several countries, also including industry. The two studies therefore complement and reinforce each other well.

Human-Animal AMR transmission
Knowledge on the mechanisms underlying the transmission of AMR between humans and animals is still greatly lacking. Most studies having investigated this process took place in a laboratory environment. Yet, the project STARCS is trying to study these horizontal gene transfer mechanisms in more complex and natural systems. New insights in human-animal AMR transmission will be gained through an international collaboration and by using new techniques and analyses of big genome-sequence datasets.

Another, completed, study taking place in a Vietnam backyard farming setting investigated the route of transmission of AMR bacteria and/or resistance determinants, comparing resistance genes in bacteria from humans and poultry. The researchers found that AMR transmission between humans and chickens was a bidirectional and complex process. The process is amongst others dependent on selective pressure through use of specific antibiotics and the type of exposure, and certain bacterial populations are likely restricted to specific hosts. These conclusions emphasise that antimicrobials should be used with caution both in the human community and agriculture setting.

AMR Surveillance in the farming environment
Early detection of AMR is crucial in limiting its spread. In the farm environment, exposure to humans can be minimised when only a few farms are positive at the time of first detection. If the resistance spreads to many farms this is no longer possible. Therefore, the goal of BEWARE is to develop a blueprint for detecting emerging AMR in livestock when the number of affected farms is still low.

Dutch programming on AMR research
ZonMw currently runs a national research programme on antibacterial resistance (ABR). Based on a government letter on ABR, the Strategic Research Agenda of the JPIAMR and a national knowledge agenda, the following research areas have been identified:

1. Mechanisms for inducing and transmitting antibacterial resistance
2. Appropriate diagnostics
3. Mechanisms and targets for new antibiotics and alternatives to antibiotics
4. Optimising antimicrobial therapy: dosage and use

More information:
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International programming on AMR research
ZonMw participates for the Netherlands in the Joint Programming Initiative on Antimicrobial Resistance (JPIAMR). In this consortium of countries we strive to maximising research efforts and benefiting from the exchange of best practices. Therefore, we updated the Strategic Research Agenda of the JPIAMR, work on data infrastructures and innovation, and participate in joint collaborative (research) actions.

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