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

A joint and multi-sectoral approach, and aligning national and international efforts, is crucial in tackling the global health threat due to AMR. Working towards effective implementation of newly acquired knowledge, expertise, and services and devices is needed to obtain true impact. That is also what will be aimed for during this 2019 Ministerial Conference, by reflecting on the progress of the global implementation of the Global Action Plan on AMR.

This factsheet provides a selection of national and international ZonMw-funded projects.

Studying new targets
Multi-drug resistance in M. tuberculosis (TB) is an increasing problem, making the discovery of novel anti-TB drugs a major global priority. An international project set out to identify compounds that target the protein secretion system (T7S), being one of the most important weapons of this bacterium. It is predicted that, by blocking multiple T7S systems with a single compound, the development of drug resistance will be considerably reduced.

Bridging the gap between exposure to AMR in the environment and impact on human health
The spread of antibiotic-resistant bacteria (ARB) in the environment (water, soil, air) contributes to human exposure to ARB. However, as information about the health effects of exposure to occupational health and safety in the environment is scarce a working group was set up. This working group aimed to describe the techniques and methodologies that currently exist to study the exposure to ARB in the environment and its consequences.

Human-animal AMR transmission
Knowledge on the mechanisms underlying the transmission of AMR between humans and animals is still greatly lacking. Most studies have 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.
**LMIC settings**

*Vietnam backyard farming*

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.

A *rapid diagnostic test for non-malaria fevers*

Because fever is a non-specific symptom, children with fever are often prescribed antibiotics without a proper diagnosis in sub-Saharan Africa. In the past, these were mainly anti-malarial drugs. Although rapid diagnostic tests for malaria are now available, the study showed that commonly used malaria tests do not work well. In addition, many children who did not suffer from malaria but did have fever, were treated with antibiotics. Even if it was not exactly determined why the child was sick. An unnecessary high amount of antibiotics and anti-malarial drugs are prescribed for this reason. It has also been established that many commonly used antibiotics are no longer effective due to resistance. This project therefore, amongst others, started with the development of a diagnostic test that can identify a number of feverish illnesses.

A *digital antimicrobial stewardship smartphone application to combat AMR: the AB-assistant*

The AB assistant, an app for the smartphone, is an innovative and standardised approach to prescribe antibiotics according to current guidelines. The use of the app is to be tested in countries with different languages and cultures. With this knowledge, the app is to be adjusted per country. The AB assistant will be evaluated in an international multi-centre, randomized study in 5-6 countries with different types of antimicrobial resistance. The most important goal is that antibiotics are used according to the guidelines.

**AMR Stewardship and Pets**

In the Antimicrobial Stewardship and Pets (ASAP) project it has been investigated whether a more directional approach within animal practices would result in more prudent use of antibiotics. The ASP consisted of amongst others a refresher training, an information folder for animal owners and individual feedback per practice. The ASP caused a significant decrease in antibiotic use in addition to the decrease in antibiotic use, which had already been initiated in the years prior to the project under the influence of other measures and factors.

Implementing automated and standardised AMR surveillance

The PRAISE network sets out to develop a roadmap to implement automated and standardised surveillance of healthcare-related infections on a large scale. So far, most automated systems have been developed in individual hospitals, which means there are major differences in their design and function, and knowledge about their development is not widely spread. The European PRAISE network will draw up a broadly supported plan of approach with which existing knowledge can be used effectively and hospitals will be given the tools to implement automated surveillance.

**National 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.

More information:  
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