

Antibiotics and antibiotic resistances in the environment - Options for Action

Background

Antibiotics enter the environment after use in human and veterinary medicine via wastewater, sewage sludge or manure (Fig. 1). 110 antibiotics have been detected in the environment in the EU. They can e.g. inhibit cyanobacteria and soil bacteria as well as plants and thus, damage ecosystems. Moreover, antibiotics exert selection pressure on environmental bacteria leading to a variety of antimicrobial resistances (AMR). This reservoir of AMR is steadily increasing. Sewage water for example, is often contaminated with antibiotic resistant bacteria and constitute a "hot spot" for the transmission of resistance genes. Their occurrence, spread or selection bears the risk of AMR transfer to pathogens – a danger to human and animal health.

Options for action

The topic of AMR in the environment is an integral part of the "One Health" approach of the WHO. Combating the spread of AMR following "One Health" is a crucial element in the *EU Strategic Approach to Pharmaceuticals in the Environment* and in *EU regulation 2019/6 on veterinary medicinal products (VMP)*. However, current EU action plans mainly include actions in the healthcare sector. In the opinion of UBA, the environment as part of the "One Health" approach is insufficiently addressed. Therefore, UBA has published a paper with seven priority areas (see below) and respective Options for Action to strengthen the fight against antibiotics and AMR in the environment.

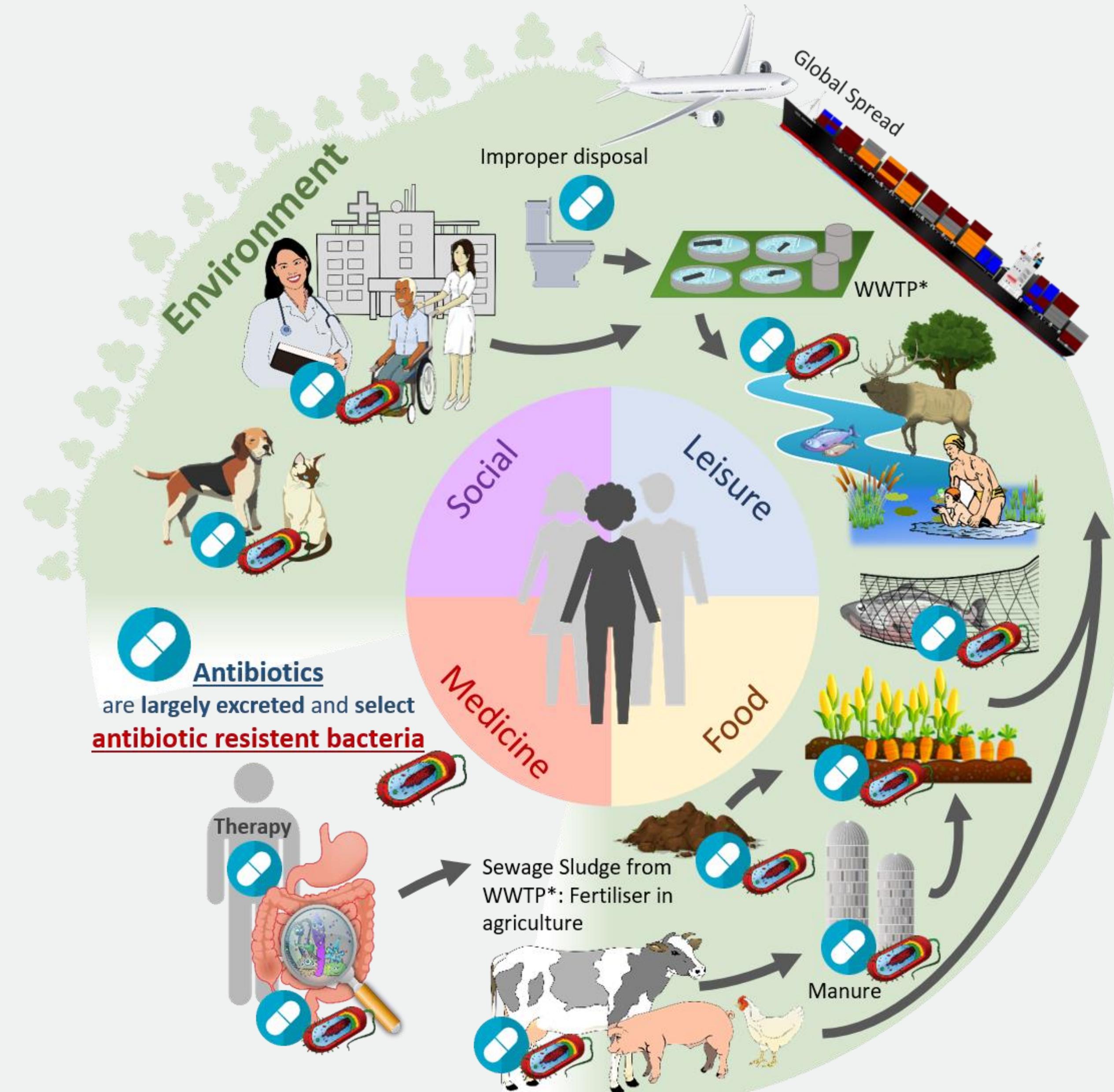


Figure 1: The environment is a reservoir and acts as a vector for antibiotic resistant bacteria.
*WWTP = Waste Water Treatment Plant

SOIL

In the soil, limit values for antibiotics, zinc and copper should be defined. The distribution of antibiotics and AMR should be monitored on selected arable farmland.

AGRICULTURE

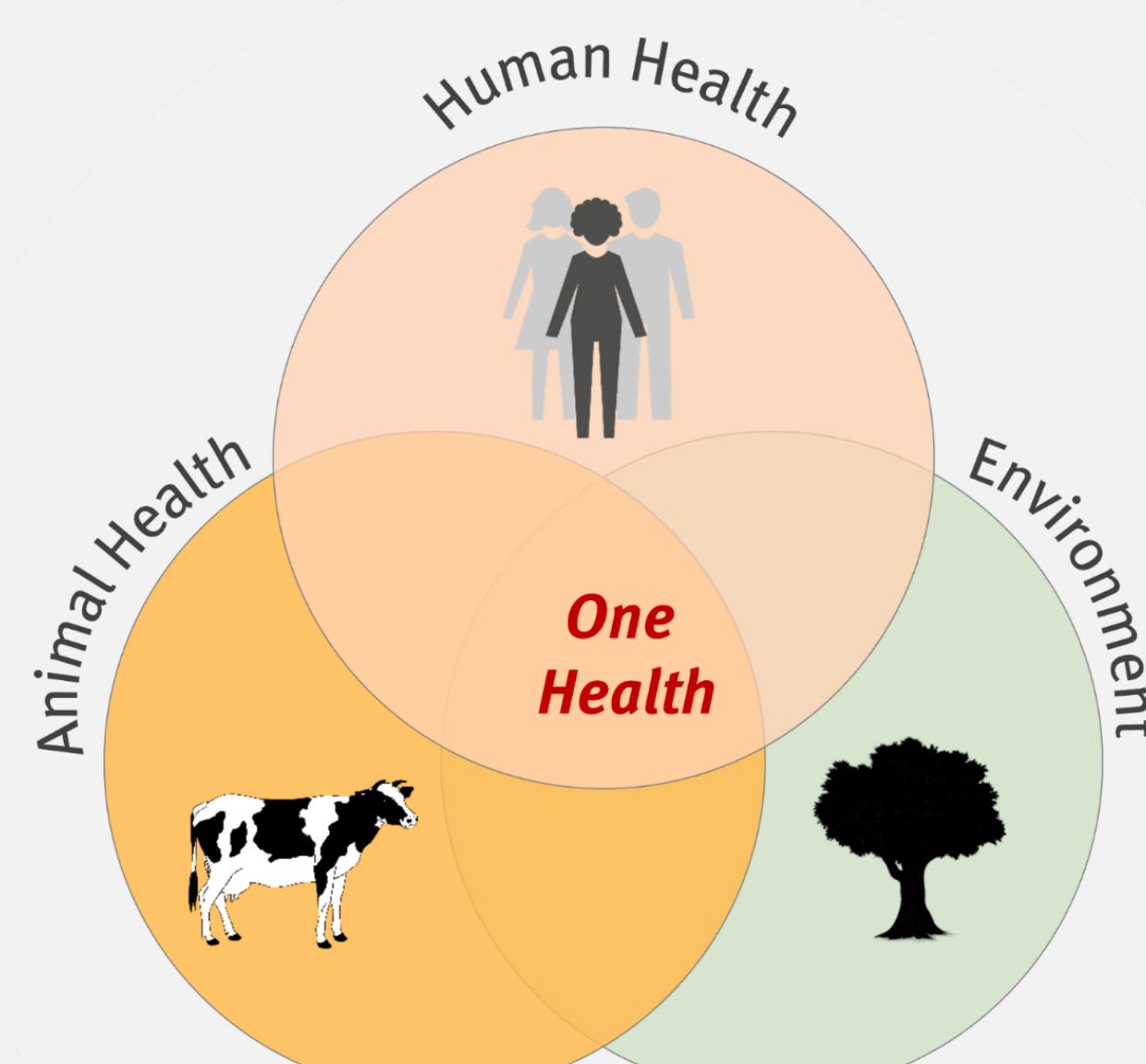
In agriculture, needs-based fertilisation is useful. Application of untreated sewage sludge should be banned. Sewage sludge should be used for the recovery of phosphorus.

WASTEWATER TREATMENT

Discharges in WWTP have to be identified (*hot spots* for AMR) and monitoring guidelines should be developed. An improvement in treatment technology is required, especially at locations with high emissions.

COMMUNICATION

Doctors, pharmacists, veterinarians and farmers should be informed and trained about the proper disposal of antibiotics.



AUTHORISATION

For the approval of antibiotics, assessment methods and criteria for AMR should be developed and implemented in the environmental risk assessment.

PREVENTION

Use of antibiotics in human and veterinary medicine should be limited to the therapeutically necessary level.

WATERS

For surface and bathing water, guidelines and assessment concepts for monitoring should be developed. UBA recommends the introduction of a threshold value for antibiotics in groundwater and the inclusion of antibiotics and AMR in the Water Framework Directive.

Conclusion

Due to the relevance and urgency of AMR, as many options for action as possible should be implemented in order to prevent and/or limit the further occurrence and spread of antibiotics and AMR in the environment, in terms of the "One Health" approach. Thereby, the requirements and proposed measures of the *EU Strategic Approach to Pharmaceuticals in the Environment* and the *EU regulation 2019/6 on VMPs* are addressed adequately.

More information: <https://www.umweltbundesamt.de/publikationen/antibiotics-antibiotic-resistances-in-the>

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