



# Better Training for Safer Food *Initiative*

*Antimicrobial Resistance One Health approach*

## **INTRODUCTION TO ANTIMICROBIAL RESISTANCE**

# BTSEF

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Food safety

**Malaga, Spain – 25-28 November 2019**

## Summary

1. What is Antimicrobial Resistance?
2. How does Antimicrobial Resistance occurs
3. Factors amplifying the emergence and spread of AB-Resistant microorganisms
4. One Health Holistic approach
5. Preventive measures
6. Conclusions

## WHAT IS ANTIMICROBIAL RESISTANCE? (AMR)

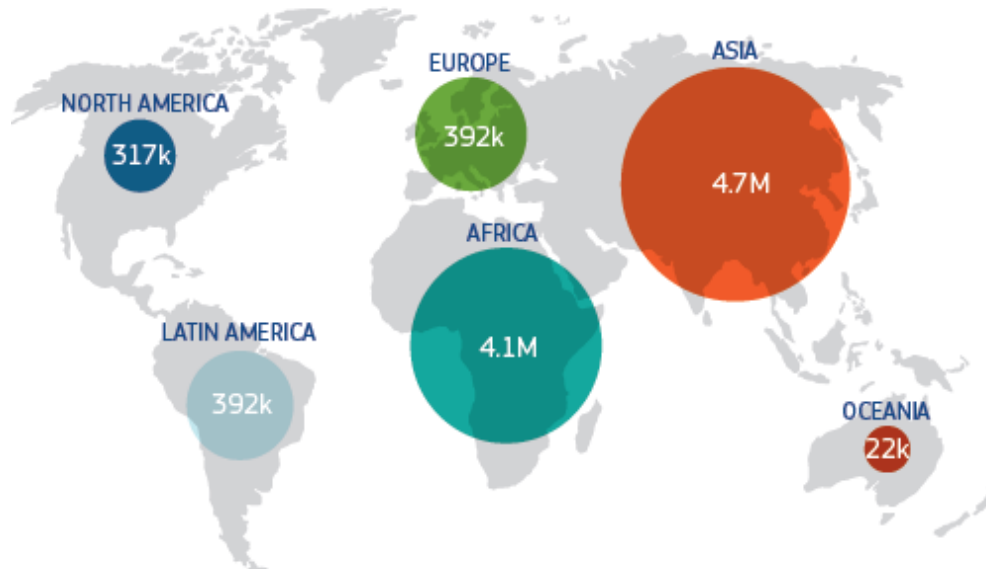
- AMR is the ability of a microorganism like bacteria, viruses, and some parasites to resist the action of an antimicrobial agent.
- This broader term covers antibiotic resistance.



Standard treatments become ineffective, infections persist and may spread to others.

# AMR: A major European and Global Challenge

- Treating infections due to resistant bacteria is a challenge: antibiotics commonly used are no longer effective
- Delay getting the right treatment may result in complications, including death.



## What is the economic cost of AMR?

- **€1.5 billion each year** - Extra healthcare costs and productivity losses due to multidrug-resistant bacteria in the EU.
- **USD 2.9 trillion by 2050** - Expected cumulative losses in OECD countries due to AMR.
- **USD 10 000 to 40 000** - Additional hospital costs per patient in OECD countries. The associated impact of lost economic outputs due to increased mortality, prolonged sickness and reduced labour efficiency are **likely to double** this figure.
- **Losses to Trade and Agriculture** - For example, in 2015 chicken sales in Norway dropped by 20% (for some distributors) following the news that a resistant strain of Escherichia coli (E. coli) was found in chicken meat.

## HOW DOES AMR OCCUR?

Resistance arises through 3 ways:

- Natural resistance
- Genetic mutation
- Transfer from other microorganisms

## CLASSICAL ANTIBIOGRAMME USING THE IMPREGNATED DISKS METHOD



Testing the effectiveness of antimicrobial drugs against specific organisms is important in identifying their spectrum of activity and the therapeutic dosage

## Factors contributing to the emergence and spreading of AMR

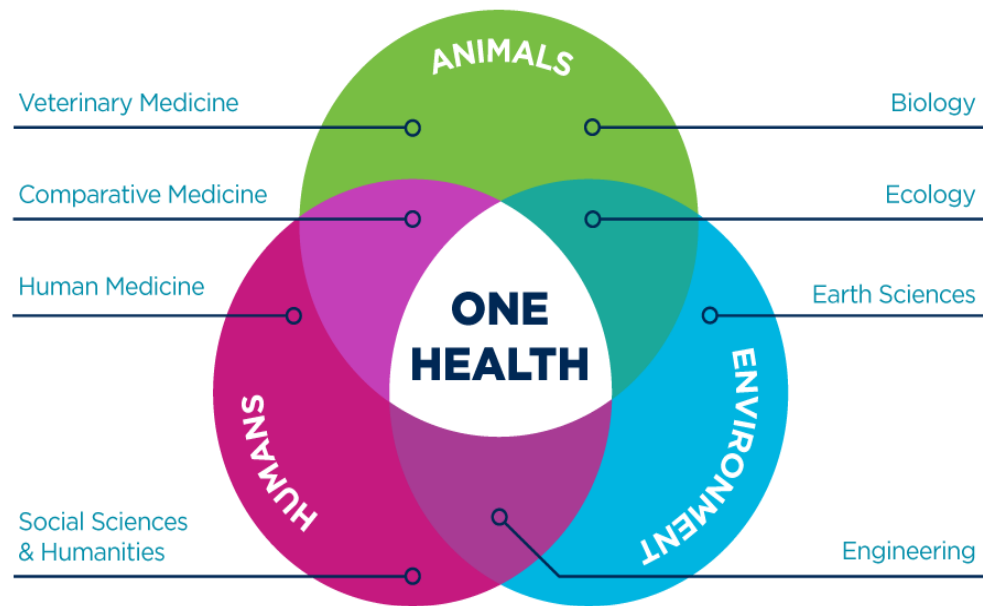
- AMR happens naturally
- Inappropriate use of therapeutic antimicrobials, including the use of antimicrobials for non-therapeutic purposes
- Poor hygiene and infection prevention and control
- People travelling: Increasing global trade and travels favouring AMR spread between countries and regions
- The pollution of the environment by antimicrobials
- Continuous development of resistance

## The need for an holistic approach and One Health Approach

- Due to the severe consequences in term of treatment failure, deaths and physiopathological consequences and costs, action is needed.
- AMR is a complex problem that affects all aspects of society and is driven by many interconnected factors, thus single, isolated action interventions have limited impact.



# One Health Approach for combating AMR



**One Health:** A worldwide strategy for expanding **interdisciplinary collaborations** (at local, national, and global level) and communications in all aspects of health care for **humans, animals and the environment**.

The synergism achieved will advance health care for the 21st century and beyond by accelerating biomedical research discoveries, enhancing public health efficacy, expeditiously expanding the scientific knowledge base, and improving medical education and clinical care.





European  
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## The need to address One Health Approach:

1. **Preventing** microbial **infections** : Adequate hygiene, Good manipulation practices.
2. **Clear diagnostic** before AB-prescription for human and animal infections.
3. Develop **effective** and targeted **antimicrobials** or **alternative** treatments. Complementary Medicines
4. **Joining forces** at international level to contain the risks for spreading AMR – best practices.
5. **Strengthen research** to develop innovate means to fight AMR.

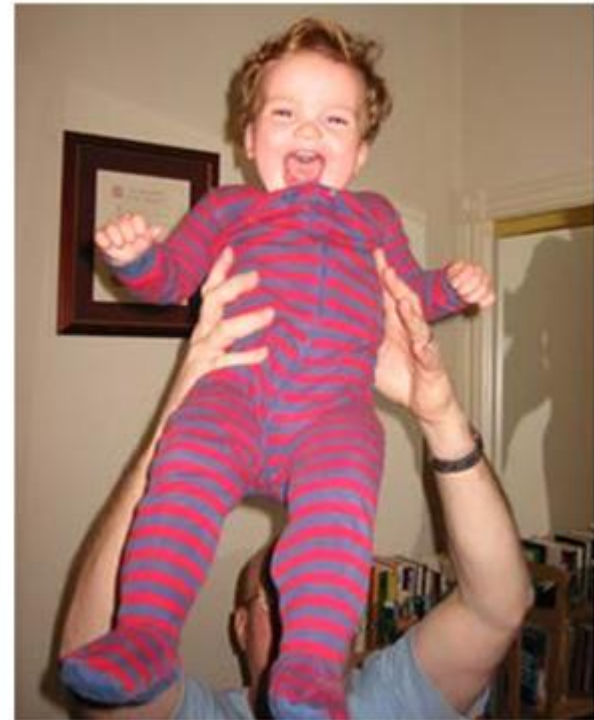
## Conclusion

- The actual situation seems to be critical
- Everyone is now informed and the international cooperation is effective – awareness has been raised
- There are some measures taken, local successes with the decrease of AMR (ex. MRSA)
- But the AMR is still increasing





The horror of diseases such as blood poisoning is easily forgotten. These pictures, taken in 1942 shortly after the introduction of penicillin, show the improvement in a child with a bacterial infection four (photo 3) and nine (photo 4) days after treatment, and fully recovered (5&6)



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