Antimicrobial resistance: a shared responsibility

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The emergence and spread of microbes that are resistant to affordable “first-line” medicines is an inevitable result of their continued, and sometimes indiscriminate, use in humans and animals. The challenge is to slow the development and reduce the spread of bacteria containing antimicrobial resistance genes.

What are antimicrobials?

Antimicrobials, such as antibiotics, are substances/agents that kill or inhibit the growth of microorganisms, other than viruses. They are commonly used in the treatment of human disease (e.g. tuberculosis, bacterial meningitis) and they play a vital role in reducing the risk of complications in clinical procedures (e.g. organ transplants, heart surgery). In addition, antimicrobials are frequently used in veterinary medicine (e.g. mastitis, pneumonia), and for non-therapeutic purposes (e.g. disinfectants, preservatives). ¹

What is the public perception of antimicrobials?

Respondents (n= 26,761) in a recent Eurobarometer survey claimed that they last took an antibiotic for a viral infection, such as a flu (20%) or a cold (14%), and 53% believed the misconception that antibiotics killed viruses. ² Eighty three percent of respondents were aware that the unnecessary use of antibiotics rendered them less effective; however, the report concluded that greater public awareness was required.

What is antimicrobial resistance?

Antimicrobial resistance (AMR) refers to the ability of a microorganism to withstand antimicrobial treatment, to which it was previously sensitive. AMR is a serious threat to public health, with an estimated economic cost of at least €1.5 billion and 25,000 deaths annually in the EU. ³

When a microorganism is continually exposed to a sub-lethal level of an antimicrobial, it develops mechanisms of resistance to it. This can be caused by a variety of factors, such as spontaneous changes in the genetic make-up of a cell, or by the stable incorporation of mobile genetic elements (containing antimicrobial resistance genes) which bacteria transfer freely among themselves. In fact, microorganisms have the ability to become resistant to a wide range of antimicrobial agents e.g. methicillin resistant Staphylococcus aureus (MRSA).

AMR microorganisms can spread through many routes (e.g. humans, animals, the environment, or food). The development of AMR in zoonotic bacteria present on/in animals or food, can potentially compromise the effective treatment of infectious disease in humans. In particular, there is much concern over the development of AMR in Campylobacter and Salmonella, currently the two most reported zoonotic infections in the EU (220,209 and 95,548 confirmed human cases in 2011, respectively). ⁴ ⁵ These bacteria
can cause gastrointestinal illness (e.g. diarrhoea, vomiting, cramping), which is generally self-limiting and rarely fatal.

What are regulators doing?

Several legislative measures have been taken in the EU to enhance the regulation and control of antimicrobials in primary food production. These include the approval and declaration of conditions of use of medicines by the European Medicines Authority (EMA), control programs for monitoring the presence of pharmacologically active substances (including antimicrobials) in food products of animal origin, the establishment of guidelines for veterinary medicinal products, and the maximum residue levels (MRLs) of antimicrobial agents in foodstuffs of animal origin. In addition, the use of all antibiotics for growth promotion purposes was banned in the EU in 2006. This precautionary measure was carried out to mitigate the development of a reservoir of AMR bacteria in food animals.\(^6\)

What is being done to combat antimicrobial resistance at the EU level?

The European Food Safety Authority (EFSA) works closely with other EU agencies to tackle AMR in Europe.\(^7\) Annual monitoring and reporting of AMR in zoonotic bacteria in humans, animals and in food is carried out by EFSA, the European Centre for Disease Prevention and Control (ECDC) and the European Commission (EC). These data are then reviewed by EFSA, who make recommendations on measures for the prevention and reduction of AMR in the food and feed chains. For example, EFSA reported that livestock-associated MRSA represented only a small proportion of all reported MRSA infection in the EU in 2009 and also that 59% of Campylobacter jejuni and 50% of Salmonella spp. recovered from samples of broiler meat in 2011 were resistant to ciprofloxacin: a clinically important antibiotic used in the treatment of salmonellosis and campylobacteriosis.\(^8\)

The EC is also proactive in the fight against AMR and they have produced an action plan which includes: the development of effective antimicrobials (and alternatives), their appropriate use, prevention of infection and spread, monitoring and surveillance, research, innovation and education: including campaigns such as the European Antibiotics Awareness Day (November 18th).\(^1\) Other important initiatives include national strategies e.g. “Responsible Use of Medicines in Agriculture” (RUMA) and worldwide strategies e.g. the “One Health” concept (collectively tackling all aspects of healthcare for humans, animals and the environment) and the World Health Organisation (WHO) call for awareness and shared responsibility in dealing with the issue of AMR.\(^9\)

Conclusion

Antimicrobials are essential in human and veterinary medicine, although evidence supports the view that their overuse/misuse is an important risk factor in the development of resistance. To minimise the threat from AMR and to ensure that antimicrobial effectiveness is preserved for both animal and human health, appropriate and responsible use of antimicrobials is required by all.
References

7. European Food Safety Authority website, Antimicrobial resistance section.