



Antibiotics for Animal Health and Welfare: An Overview

Summary

This document provides an overview of the role of antibiotics in veterinary medicine, for companion and farm animal health and welfare. It also introduces the important topics of antibiotic resistance and responsible use of antibiotics.

Introduction

Good husbandry, biosecurity and hygiene are the cornerstones of protecting animal health and welfare on our farms, and we also need to look after our pets responsibly. However, despite our best efforts, like people, animals can succumb to disease. While many of these diseases can be prevented, for example by vaccination, there will always be cases where animals will need to be treated with antibiotics. These medicines have a vital role in treating, controlling and sometimes preventing the spread of bacterial diseases in our farm livestock and companion animals.

Farmers, vets and all those involved in the care of animals have a moral and legal duty to protect the health and welfare of animals under their care. The UK has some of the highest animal welfare standards in the world with protection provided under animal welfare legislation (1, 2). Our commitment to safeguarding animal welfare includes the judicious use of antibiotics, prescribed only by a veterinary surgeon when infection and disease would result in pain and suffering.

Another important aspect of antibiotic use is their role in helping vets and farmers with the production of safe food from healthy animals.

Without the use of appropriate antibiotics, pets and farm livestock would endure pain and suffering and the production of safe food could be endangered.

Antimicrobials and Antibiotics⁽³⁾

Antimicrobial is a broad term for any compound with a direct action on micro-organisms, used for the

treatment or prevention of infection. It includes anti-bacterials, anti-virals, anti-fungals and anti-protozoals.

Antibiotics (anti-bacterial compounds) have a direct action on bacteria and are used for the treatment or prevention of infection. Commonly, the term antimicrobial is used to mean antibiotic. However, antibiotics are just one type of antimicrobial.

Not all antibiotics are effective against all bacteria. They can be classified based on their spectrum of activity – they may work on a narrow or broad range of bacteria. They can also be grouped based on their ability to prevent the growth of bacteria (bacteriostatic) or to kill bacteria (bactericidal).

Antibiotics can also be grouped according to their relative importance in human medicine with those of greatest importance called Critically Important Antimicrobials (CIAs) by the World Health Organisation (WHO). The European Medicines Agency (EMA), which is responsible for the scientific evaluation, supervision and safety monitoring of medicines in the EU, has further categorised the WHO list of CIAs to guide the use of antibiotics in animals (4).

Antibiotics may be given in different ways, such as by tablet, by injection, in drinking water or in feed. As in human medicine, the prescribed course needs to be completed in full following the label instructions, including the correct dosage levels and treatment recommendations provided by the vet.

Importantly, the antibiotics we use are licenced veterinary medicines that have gained a marketing authorisation through a rigorous process overseen by independent UK and European scientific and technical experts following a strict EU regulatory process (5, 6). Years of research and development generates a significant body of data, called a dossier that is assessed before approval is given. In order to be licensed for use, the veterinary medicine must meet

high standards of quality, efficacy and safety for our animals, people and the environment.

Antibiotics for animal health and welfare

In the UK, we expect high standards of health and welfare for our animals. Antibiotics play a very important role in safeguarding the health and welfare of a broad range of animal species that include our companion and farm animals. The timely treatment of bacterial diseases can alleviate and prevent further suffering and in the case of zoonotic disease (disease that can be transferred between animals and people) even prevent infection in people.

When a bacterial disease occurs, a veterinary surgeon may prescribe an appropriate antibiotic for treatment. Antibiotics are legally classified as 'POM-V', which means they are prescription only medicines, which can only be prescribed by a veterinary surgeon. Professional judgement is used to decide if an antibiotic is required and if so, which antibiotic should be given.

Treatment may be prescribed to individual sick animals or groups of animals as appropriate. Therapeutic or curative treatment refers to the treatment of an ill animal or groups of animals. In case of groups of animals e.g. in flocks/herds on farms, treatment may be provided to the whole group where clinical disease has been diagnosed within the group. This will treat clinically ill animals and control the spread of disease to animals in close contact and at risk – these animals may already be sub-clinically infected. This mode of treatment is called metaphylaxis. On occasion, when a veterinary surgeon determines that there is a high risk of disease, preventative (referred to as prophylactic) use of antibiotics is needed to prevent bacterial disease in an individual or a group of animals with the resulting welfare implications. Such decisions are based on epidemiological and clinical knowledge and should never occur on an ongoing basis or to compensate for poor animal husbandry practices.

Companion animals

The use of antibiotics in companion animal medicine and surgery has allowed the effective treatment of a wide range of common bacterial infections and diseases. Additionally, the availability of antibiotics has been crucial for successful outcomes in specialised areas of veterinary medicine, including orthopaedics and oncology, when bacterial infections can arise as complications. Antibiotics may also be appropriate in certain scenarios for immunosuppressed or debilitated animals undergoing surgery or in contact with infected animals (7). With further advancements in companion animal medicine and surgery on the horizon, there will be a continued need for an appropriate range of antibiotics.

Farm animals

Antibiotics have an important role to play in both farm animal health and welfare and in the safety of public health.

Irrespective of the farming system, animals can and do succumb to bacterial disease. This has implications for not only the welfare of livestock, but for the farmer's livelihood as a food producing business, and even potentially for the health of people eating food derived from animals. The foundation for producing safe food from healthy animals involves preventative animal health strategies. Farmers and animal health professionals work closely to develop herd or flock health plans to ensure all possible measures are in place to prevent or reduce disease burden, including the use of vaccines, good biosecurity and hygiene. When it is a group of animals that requires veterinary care, treatments may be provided in feed or in water to assist in the safe and stress-free administration of an antibiotic.

Of special importance for food producing animals is the adherence to withdrawal periods: the time during which treated animals cannot be slaughtered for food, nor can their products enter the human food chain. This applies to all animal medicines, including antibiotics (8). Extensive surveillance testing for veterinary medicines residues by highly sensitive methods and enforcement of the required withdrawal period by regulatory authorities ensures the safety of food from such animals, with results being published (9). Withdrawal periods are also strictly enforced for food from animal origin imported into the UK.

Antibiotic Resistance

Antibiotic resistance is a complex and topical issue that concerns all those involved in the prescribing and use of antibiotics.

Antibiotic resistance is the ability of bacteria to grow or survive in the presence of an antibiotic that is usually sufficient to inhibit or kill bacteria of the same species (10). The broader term, antimicrobial resistance, or AMR, is resistance to any compound with a direct action on micro-organisms used for treatment or prevention of infections (though commonly this term is used with a focus on antibiotics). Antimicrobial resistance is a broader term than antibiotic resistance. From a public health perspective, the focus is on antibiotic rather than antimicrobial resistance.

Antibiotic resistance is a natural phenomenon that bacteria have developed as a defence mechanism to survive in an environment where other bacteria and fungi produce naturally occurring antibiotics. Resistance genes have been detected in 30,000 year old sediment samples – occurring long before the advent of modern clinical antibiotic use (11). This means that resistance will continue to arise and can never be fully prevented.

Today, there are serious concerns in human medicine because resistance is making bacterial infections harder to treat. It is increasingly acknowledged that the main driver of resistance in people is the result of antibiotic use by people. A published government strategy published – ‘UK five year antimicrobial resistance strategy 2013-2018’ stated that “Increasing scientific evidence suggests that the clinical issues with antimicrobial resistance that we face in human medicine are primarily the result of antibiotic use in people, rather than the use of antibiotics in animals” (12).

The guardianship of antibiotic use and development of policy in this area should be based on scientific knowledge and understanding. The epidemiology of resistance is complex and more research is needed on the evolution and dynamics of antibiotic resistance to fully inform our decision making and all sectors, including human and veterinary, need to play their part. Veterinary use of antibiotics has been the focus of considerable review and significant efforts are being made to preserve the effectiveness of available antibiotics through responsible use not only for public health but to protect the health and welfare of our animals.

Antibiotic Stewardship and Responsible Use

We all share responsibility in ensuring that antibiotics are used appropriately – as little as possible, but as much as necessary. It is in the best interest of people, farmers, veterinary surgeons and the animal medicines sector to maintain the effectiveness of our veterinary medicines.

In this regard, a ‘One Health’ collaborative approach is needed with veterinary surgeons, the medical profession, researchers, industry and regulatory bodies working together to consider antibiotic use in people, animals and the wider environment. The veterinary sector, including NOAH, collaborates in the ‘Antibiotic Guardian’ scheme coordinated through public health professionals throughout the UK to increase understanding and raise awareness of the importance of this topic to us all (13).

The animal health sector takes seriously its own responsibility in this area. For example, it is actively involved in the development and promotion of responsible use guidelines. In the UK these are produced by RUMA (the Responsible Use of Medicines in Agriculture Alliance) (14). RUMA has produced an action plan for the livestock sector to implement its part of the UK government’s five year antimicrobial resistance strategy (15, 16).

Additionally, the UK veterinary medicines regulator - the VMD (Veterinary Medicines Directorate) has been working closely with the different livestock sectors to develop better data collection systems for antibiotic

use on farm. This data will provide important information to further improve and guide our prescribing of antibiotics on farm.

Conclusions

- In the UK, we expect high standards of health and welfare for our animals, and there is a legal obligation to protect this.
- Antibiotics are essential for safeguarding animal health and welfare as well as the safe production of food of animal origin.
- Farmers and their veterinary surgeons have a legal obligation to observe post-treatment withdrawal periods to avoid antimicrobial residues in food of animal origin.
- All antibiotics used in animals are rigorously tested and independently assessed prior to their approval for use and are only available on veterinary prescription.
- The concerns about potential impact on human health continue to be addressed by the animal health sector and independent bodies, with a ‘One Health’ approach.
- Responsible use initiatives have been in place for many years in the UK and continue to educate vets and farmers on disease prevention and responsible use. An example of this are the guidelines produced by RUMA on responsible use of antimicrobials in the major farm species.

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What is NOAH?

The National Office of Animal Health Ltd represents the UK animal medicine industry: its aim is to promote the benefits of safe, effective, quality medicines for the health and welfare of all animals. For further information, including more briefing documents on animal medicines topics see www.noah.co.uk and follow @UKNOAH on Twitter. For more information on RUMA, including responsible use guidelines, visit www.ruma.org.uk. (For more information see NOAH briefing documents on Antibiotic Resistance, Responsible Use of Antibiotics and Medicated feed).

References:

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