Frequently asked questions about antibiotic use in animals

This FAQ can help people understand the importance of antimicrobial use in keeping our pets and livestock healthy, as well as the evolving risk of antimicrobial resistance and the measures in place to manage the responsible use of antimicrobials in Australia.

Introduction

Even with the best quality management and care, animals can become ill or injured and some will continue to develop bacterial infections, just as people will. There will always be a need to use **some** antibiotics in **some** animals, **sometimes.**

The responsible use of antibiotics in both veterinary and human medicine is essential to protect both animal and human health and ensure that animal-derived products, such as meat, milk, eggs, leather, and wool, are safe for human consumption and use.

Antibiotics should never be routinely used in place of good animal care practices. However, it is vital that antibiotics remain available for a veterinarian to use when an animal is sick, or likely to become sick, from a bacterial infection.

Using the **right** antibiotic at the **right** dose, at the **right** time, and for the **right** duration will treat an infection most effectively and efficiently, thus reducing the development of resistance and protecting the effectiveness of antibiotics in the future.

- Antibiotic
- Dose
- Time
- Duration

Antibiotics contribute to better animal health and welfare.

Animal welfare starts with good animal care and management practices that reduce the risk of disease and improve the animal's quality of life. Healthy animals lead better quality and more productive lives, are less susceptible to infection and disease, produce higher quantities and better-quality food and fibre, consume fewer resources, and support Australia's multi-billion dollar agricultural and pet industries.

Antimicrobials are an important part of good veterinary care and are essential to treat bacterial infections. Antibiotics are just one of many tools that farmers use to keep their animals healthy and minimise the risk of disease. Animal husbandry practices that support good animal health and welfare include (but are not limited to):

- Good housing, shelter, and nutrition
- Strong hygiene and biosecurity practices
- Regular parasite and pest control
- The use of vaccines to prevent disease (where possible)
- Early detection and treatment of illness and disease
- Use of pain relief for routine husbandry procedures (e.g.: tailing, castration)
- Use of low-stress stock handling techniques during mustering, handling, and transport
- Selective breeding for welfare-friendly traits, such as polled (hornless) cattle and calm temperaments

However, even with the highest possible standards of animal health and welfare, it is inevitable that some animals, at some point in their lifetime, may develop a bacterial infection and require antibiotic treatment to return to health. Bacteria are ubiquitous in the soil, vegetation, and water – it is impossible to prevent the exposure of animals (and humans) to all bacteria that could, potentially, cause an infection.

We have an ethical and moral responsibility to prevent illness when possible and treat sick animals when necessary – and antibiotics can help us do this. It is unethical to withhold antibiotic treatment from an animal that needs it.

Questions:

Introduction to antibiotics

- What are antibiotics?
- Why do we use antibiotics in animals?
- When do we use antibiotics in animals?
- Why do we treat groups of food-producing animals rather than individuals?
- How can we reduce the need for antibiotics in animals?

Introduction to antimicrobial resistance

- What is antimicrobial resistance?
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- What measures are put in place to reduce the risk of antimicrobial resistance developing in animals?

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- How are antibiotics in animals regulated and monitored in Australia?
- Are there antibiotics in my food?

Answers:

Introduction to antibiotics ▸

What are antibiotics?

Antibiotics are medicines that treat or stop the spread of an illness caused by bacteria. Antibiotics are the only type of antimicrobial medicine that are effective at fighting bacterial infections.

The medicine works by attacking disease-causing bacteria, typically through one of three ways:

1. The antibiotic prevents bacteria from multiplying and the disease dies off.
2. The antibiotic attacks the bacteria and prevents it from repairing itself.
3. The antibiotic destroys the cell wall of the bacteria, which is essential to its survival.

Antibiotics do not work on other organisms such as viruses (this is why they are not prescribed for people with influenza, which is a viral illness).

Antibiotics can take different forms, but the most common is a tablet or injection.

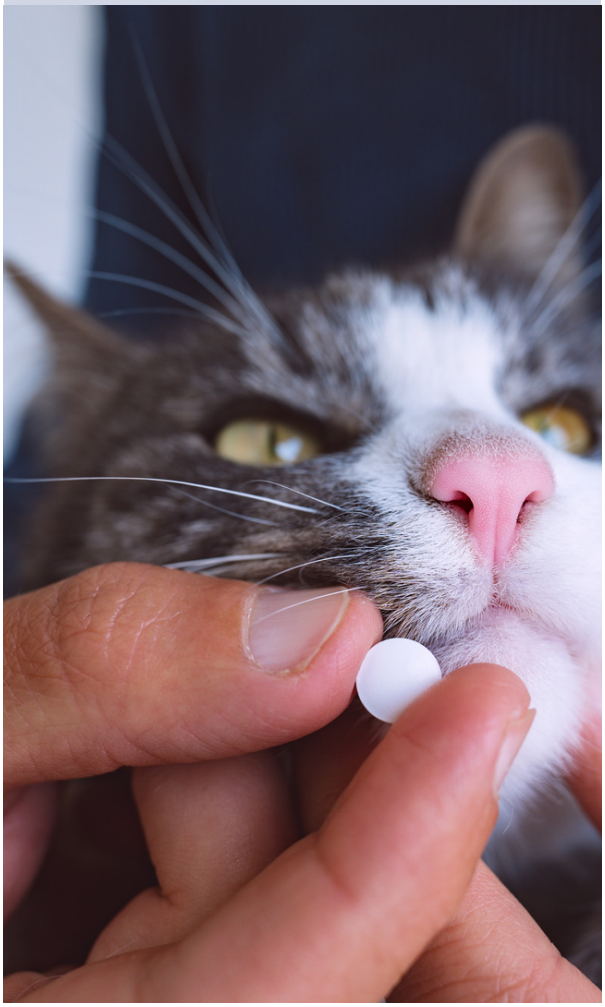
No matter the method, the bottom line is that an antibiotic treatment stops the growth of a bacterial infection so the host (i.e. the animal) can eliminate it. The animal can then recover and return to good health.

There are several types or ‘classes’ of antibiotics. Some are effective against a wide range of bacteria, while others may target only a small set of bacteria.

In addition, certain antibiotics can be used in both people and animals, while some are only effective in animals or only in people.

Any new antibiotics are likely to be reserved for use solely in humans, even if they are also effective in animals.

This means there is a limited number of antibiotics available to treat a bacterial infection in an animal, which makes responsible use essential to reduce the development of resistance and ensure that the antibiotics available for use in animals remain effective in the future.



Why do we use antibiotics in animals?

We have an ethical and moral responsibility to prevent illness when possible and treat sick animals when necessary.

Animals get sick just like we do. This means that, sometimes, they will need antibiotics to control infections and stop the infection from spreading to other animals.

Animals are vulnerable to some of the same bacterial infections as people, such as pneumonia, septicaemia, urinary tract infections, and skin infections, which can be treated effectively with antibiotics. Many infections cannot be managed without antibiotics.

Animal medicines are essential to help farmers keep their animals healthy and support sustainable livestock production, as well as helping pet owners keep their companion animals healthy and happy. These medicines not only treat the disease but also the animal by reducing the duration of sickness. This reduces the animal’s suffering and contributes to their ongoing welfare and wellbeing.

Antibiotics:

- ✓ treat the disease
- ↓ the duration of sickness
- ↓ the animal’s suffering
- \+ contributes to wellbeing

Ensuring good health through preventative health measures, biosecurity, and nutrition are the first line of defence against serious illness in our pets and livestock – but antibiotics are essential when these defences are not sufficient or are weakened and a bacterial infection sets in.

Eliminating the use of antibiotics will have significant negative consequences for animal welfare and higher mortality rates.

The loss of animals to preventable disease will also lead to more animals being raised to replace those lost to disease.

When do we use antibiotics in animals?

Antibiotics may be needed to:

1. treat animals that have been diagnosed by a veterinarian with a bacterial infection. Especially when there is a non-responsive or recurrent infection, laboratory testing should be used to identify the pathogen and assist with the selection of the most appropriate antibiotic.*

- For example, some cows will develop mastitis during lactation. Mastitis is a very painful udder infection and requires rapid treatment with intramammary antibiotics for the welfare of the animal, and to ensure that the milk from that farm remains safe for human consumption.
- A human health equivalent would be a urinary tract infection (UTI). UTIs can be very painful and can lead to serious bladder and kidney infections. Someone with a UTI will be prescribed antibiotics by their medical practitioner to treat the infection.

**the cost of laboratory testing in veterinary medicine is borne entirely by the animal owner, unlike human pathology testing which is subsidised by the government.*

2. control the spread of disease within a group of animals. Infections can spread rapidly between animals (especially between mother and offspring, and within a flock or herd), so when a sick animal is identified, rapid treatment of all animals in close contact can prevent significant animal suffering.

- For example, cattle are susceptible to bovine respiratory disease (BRD) following transport. Some animals in the group will likely develop bacterial pneumonia within a few days of transport. This disease can result in fever, lethargy, lack of appetite, cough, and, in some cases, death of the animal. The pathogen is highly infectious and will spread rapidly to other cattle unless they are appropriately treated to control the outbreak.
- In people, when someone is diagnosed with meningitis, those who have been in close contact with the infected person are given antibiotics as a precaution to prevent the spread of the disease.

3. prevent the disease from occurring in animals in circumstances when the infection is very likely. This could be at certain times of the year (for example, related to the seasonal activity of insects that carry disease) or at specific life stages when the infection is most likely to occur.

- For example, young pigs are vulnerable to dysentery at weaning which can quickly lead to septicaemia, meningitis, infectious arthritis, and pericarditis, and potentially die. A short preventative course of antibiotics can protect the most vulnerable piglets during this very specific life stage.
- Antibiotics are also used preventatively in humans at specific times when infection is more likely. This includes before and after major surgical procedures (especially cardiovascular, orthopaedic, and dental procedures) or when a person's immune system is suppressed (such as during chemotherapy).

Why do we treat groups of food-producing animals rather than individuals?

Using antibiotics in animals at risk of disease can stop one case from becoming an outbreak.

Food-producing animals are usually raised in groups and bacterial infections can spread extremely quickly between individuals. Treating and controlling an infectious disease in a group of animals is similar to treating and controlling an infectious disease in a group of people.

For example, a large naval carrier can be home to several thousand people at a time. Just like herds of cattle or flocks of chickens, naval crews live in close proximity. They need to be kept healthy and they need to receive treatment when they are sick.

On-board medical protocols are very similar to on-farm animal health protocols.

Crew members get preventative care, such as vaccinations and good nutrition, to prevent illness from occurring whenever possible. If a crew member gets sick, the entire population is carefully monitored for signs of infection and treated as needed.

However, infections can spread quickly, often before a person feels unwell or shows obvious symptoms. A large number of crew members suddenly falling ill at the same time would have disastrous effects on its ability to function and perform its duties. Therefore, in some circumstances, the entire crew may need to be treated to quickly control the spread of the disease and prevent many more people from getting sick.

Managing the health of a group of animals is the same – when an infection does occur, the affected animal should be promptly treated.

However, food-producing animals are usually raised in groups and it may not be possible to physically isolate individual animals.

The most appropriate treatment of a sick animal must consider the conditions of the whole herd or flock, including the animal species, age and condition, the severity of illness, number of animals, type of housing, the range of medicines registered for use in that species and for that disease, and the formulations of those medicines (for example, injections vs tablets vs feed additives).

The infection of an entire herd or flock of animals would be associated with substantial animal suffering and pain. Treating the entire herd or flock may therefore be necessary to prevent the spread of the disease and protect the welfare of those animals.

How can we reduce the need for antibiotics in animals?

We can reduce the need to use antibiotics in animals through disease prevention, regular diagnostic testing, and good animal husbandry.

Vaccinated animals that are fed a nutritious diet, housed appropriately, and have regular veterinarian visits are simply less likely to need an antibiotic.

Why? Each step reduces the risk of the animal falling ill with a bacterial infection.

- **Vaccines** prevent diseases from occurring while good nutrition bolsters an animal's immune system.
- **Biosecurity** measures, such as strict on-farm and transport **hygiene** protocols, help stop infectious diseases from entering the farm.
- **Regular veterinarian visits** ensure animal health is closely monitored by an expert, while tools like immunostimulants and improved genetics offer new ways to strengthen the animals' natural defences.
- If an animal does fall sick, **digital technologies** like wearable sensors and A.I.-powered monitoring can help a veterinarian catch it even earlier. Changes in a cow's respiratory rate or temperature, or the development of a quiet cough, may be the first subtle indications of something serious and enable **early treatment** to reduce pain and suffering.
- Increasingly accurate **diagnostic tools** can help veterinarians find the most appropriate treatment, which may not always be an antibiotic. Furthermore, regular diagnostics can be a powerful **surveillance tool** to detect bacterial disease before an illness is able to spread widely in a group or herd of animals.

To avoid negative impacts to animal welfare, we cannot simply stop using antibiotics in animals or withhold antibiotic treatment from an animal when it is needed.

"Reducing antibiotic use" has become a popular mantra for tackling the growing problem of antibiotic resistance, but by itself, this solution is too simplistic. It overlooks an essential part of the conversation: animal welfare. It is unethical to withhold antibiotic treatment from an animal that needs it.

Bans and further restrictions on antibiotics will leave animals to suffer from treatable bacterial diseases, which could pose risks to food safety for consumers, and veterinarians would have no effective medicines to use. It ignores an animal's right to treatment.

Reducing the need for antibiotics, though, tackles the same animal health problems but without creating additional challenges. It starts from a responsible stewardship perspective: preventing the need to use antibiotics in the first place by reducing the occurrence of disease.

By better protecting animals from the threat of disease, identifying health issues earlier, and treating them quickly and responsibly, we can decrease disease levels and with it, the need for antibiotics. HealthforAnimals' 'Roadmap to Reducing the Need for Antibiotics' outlines this strategy in more detail.

What is antimicrobial resistance?

Antibiotics work by killing or inhibiting the growth of harmful bacteria that cause illness and disease.

Bacteria are living organisms and they have the ability to adapt (or become 'resistant') to the effects of antibiotics – in other words, the harmful bacteria are able to continue to multiply, and do not die, when exposed to antibiotics that usually kill or damage them. This is called antibiotic resistance (AMR).

The development of antibiotic resistance is a natural process that existed long before modern antibiotics. It is a classic example of "survival of the fittest", where evolution over generations encourages the survival of the strongest members of a population that are able to persist in adverse conditions – for example, a strain of bacteria that is able to survive when the person or animal is treated with antibiotics. The misuse and/or overuse of antibiotics may also accelerate the development of antibiotic resistance.

Antibiotics are so important in treating many common and serious diseases that antibiotic resistance is considered one of the biggest global health emergencies. If resistance to key antibiotics is not properly managed, it could mean that minor, treatable infections could more easily become major, lasting health threats that could lead to death because there are no effective antibiotic treatments available.

However, responsible antibiotic use can help manage AMR and preserve the effectiveness of these medicines for the future. For example, using vaccines to prevent a disease, instead of using an antibiotic to treat it after it occurs, can ultimately reduce the need for antibiotics.

As outlined in the global 'Roadmap to Reducing the Need for Antibiotics,' this type of approach offers a sustainable way to address resistance by reducing disease burden.

Antibiotic resistance is a threat to both people and animals, which is why strategies to contain it need a "One Health" focus. This means adopting approaches that unite doctors and veterinarians to tackle the problem in both areas at once.
o antibiotics that usually kill or damage them. This is called antibiotic resistance (AMR).

Is the threat of antimicrobial resistance growing or changing?

Antimicrobial resistance is now a major cause of death worldwide – with an estimated 4.95 million deaths associated with AMR in 2019[1].

Just as in human health, AMR poses a major threat to animal health, welfare, and production.

Infectious diseases can cause significant animal pain and suffering, including death. Infections that are resistant to antibiotics are very difficult to treat, and treatment options may become increasingly limited in the future as resistance develops. This poses grave dangers to animal welfare and threatens the sustainable production of food and fibre that is safe for human consumption and use.

It is critically important that pet owners and livestock producers use antibiotics responsibly, judiciously, and only when needed. It is very likely that any new antibiotics developed in the future will be reserved for human use only and will not be able to be used in animals. Veterinary medicine cannot rely on the development of new antibiotics to provide alternative treatments to antibiotic-resistant infections.

We must therefore use what we already have extremely carefully to minimise the development of resistance and ensure that we are able to treat and control many debilitating animal diseases in the future.

What measures are put in place to reduce the risk of antimicrobial resistance in animals?

Australia has one of the most conservative and highly regulated approaches in the world to the use of antimicrobials in food producing animals. All antibiotics used in animals are available only on prescription from a registered veterinarian and antibiotics ranked as 'High' importance to humans are not registered for use in food-producing animals in Australia.

The risk of antimicrobial resistance developing in humans as a result of use in animals in Australia is considered low[2] and, together with New Zealand, Australia reported the lowest human AMR burden in the world in 2019[1].

It is important, however, that efforts continue to ensure that this risk remains low and these valuable animal health tools continue to be viable and effective in the future.

The global animal health sector is committed to facilitating the responsible use of antibiotics in Australia and around the world. Our Commitments and Actions on Antibiotic Use and Roadmap to Reducing the Need for Antibiotics demonstrate how the animal health sector has worked to bring these same principles to the global level.

In August 2019, the global animal health sector published the 'Roadmap to Reducing the Need for Antibiotics', a strategy for addressing antimicrobial resistance and improving responsible use. It was undersigned by the world's largest animal health companies and demonstrated a unified approach to a global challenge.

The Roadmap offered a vision for decreasing disease levels, reducing the need for antibiotics, and preserving welfare by fundamentally improving how we care for animals. It called for greater commitments to veterinary access, farmer training, AMR monitoring, vaccine development, and more.

The objective was to deliver meaningful action that could help improve responsible use and address AMR, and the Roadmap identified 25 clear, measurable actions that the animal health sector committed to completing by 2025.

In 2021, HealthforAnimals released a Progress Report outlining how the sector was delivering on these commitments. To date, all are either on track, ahead of schedule, or already completed.

These include results like:

- ✓ 50 of 100 new vaccines delivered
- ✓ 657,000 veterinary professionals indirectly trained
- ✓ US$6.7M in veterinary scholarships, exceeding the US$5M goal

Another Progress Report will be published in 2023.

AMA continues to partner with the Australian Veterinary Association, along with contributions from livestock groups and others, to develop evidence-based best practice antibiotic prescribing guidelines for major livestock species in Australia, to support the responsible and judicious use of antibiotics[3]. These guidelines will be freely available to veterinarians.

To further support veterinarians to make informed, evidence-based decisions in their daily practice, the AMR Vet Collective translates the science around antimicrobial resistance and stewardship into meaningful and practical information. The AMR Vet Collective provides a one-stop shop for antimicrobial resistance and stewardship resources, including prescribing support, guidelines, continuing education and practice resources.

The various livestock sectors, including red meat, dairy, pork, and poultry, are equally committed to improving antimicrobial stewardship in Australia.

These industries came together to form the Animal Industries' Antimicrobial Stewardship Research, Development and Extension Strategy (AIAS), to collaborate on antimicrobial stewardship research, development and extension (RD&E) activities of mutual interest and benefit.

How are antibiotics regulated and monitored in Australia?

All veterinary medicines in Australia, including antibiotics, undergo a rigorous review and approval process by Australia's regulatory agency, the Australian Pesticide and Veterinary Medicines Authority (APVMA).

Before any veterinary medicine can be sold and used in Australia, manufacturers must demonstrate it is safe for the animal and the person administering it, and that it poses no significant risks to the environment.

Where applicable, the APVMA seeks the advice of the National Health and Medical Research Council (NH&MRC) to conduct an assessment to ensure a product does not pose any public health risks from the development of AMR in human pathogens associated with the use of antibiotics in animals [4].

This assessment applies to:

- all new registrations of a product in Australia that contain an antibiotic;
- the extension of use in Australia of a registered product containing an antibiotic where there is likely to be a significant increase in the volume of usage; or
- the extension of use in Australia of a registered product containing an antibiotic where there may be an increased risk to public health as a result of the use of that antibiotic.

The APVMA follows a scientific, risk-based process to determine whether a product may pose a risk to public health related to AMR and whether that risk can be mitigated. This process involves three steps:

1. A **hazard assessment** to determine whether the product has the potential to cause harm.
2. An **exposure assessment** to determine the likely extent of exposure to the product.
3. The **risk characterisation** uses the information from steps 1 and 2 to determine the overall level of risk of the product causing harm and whether that risk can be appropriately managed through provision of instructions for safe handling, use, storage, disposal of unused product and its packaging.

Once a product is on the market, it is monitored through 'pharmacovigilance' systems, where both national and global regulatory authorities track and investigate any reports of issues arising from the use of veterinary medicines. Companies monitor their products closely to ensure they remain safe and effective.

Antibiotics that are used in both animals and human health are known as **'shared class'** or **'medically important'** antibiotics.

Medically important antibiotics can only be used for animals in Australia to treat and control bacterial infections, and are available only on **prescription from a registered veterinarian.**

The ***Importance Ratings and Summary of Antibacterial Uses in Human and Animal Health in Australia*** (the Antibacterial Importance Ratings) categorises antibiotics as either of 'high', 'medium' or 'low' importance for the mitigation of antibiotic resistance in humans[5]. Antibiotics ranked as 'High' importance and are used in human medicine, are not registered for use in food-producing animals in Australia.

Are antibiotics in my food?

Food safety is a cornerstone of development and regulation of antibiotics used in food-producing animals. Every antibiotic has a clear 'withholding period' – the number of days after an antibiotic treatment before an animal or its produce can enter the food supply.

This withholding period allows time for the animal to sufficiently metabolise the antibiotic and ensure that milk, meat, eggs, and fibre are free of residues or trace amounts of a medicine. The withholding period is printed on the product label so users know how to use the product responsibly.

Regulations surrounding withholding periods are set and upheld internationally, and both are reviewed as part of a product's approval process by the APVMA.

The Department of Agriculture also conducts random tests on animal products for antibiotic residues to ensure that withholding periods are being respected [6].

For more information on the use of antibiotics in animals:

- Australian Veterinary Association
- The AMR Vet Collective
- Australian Government: AMR and animal health in Australia
- APVMA: Antibiotic Resistance in Animals

References:

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