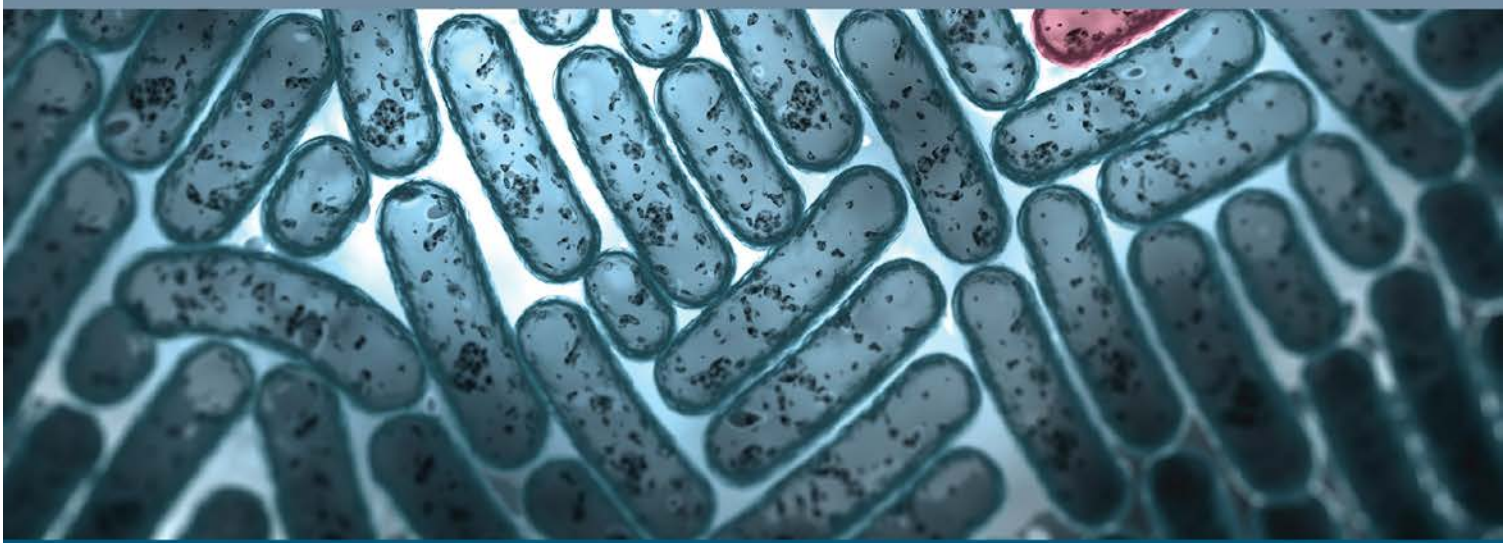
Australian Government

Importance Ratings and Summary of Antibacterial Uses in Human and Animal Health in Australia



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The Antibacterial Importance Ratings capture the knowledge of national and international experts with backgrounds in human and animal medicine and is based upon the best available evidence at the time of completion. Readers should not rely solely on the information contained within this document.

Antibacterial Importance Ratings is not intended to be a substitute for advice from other relevant sources including, but not limited to, the advice from a health professional. Clinical judgment and discretion may be required in the interpretation and application of this information.

The information in this publication is not treatment advice in either human or animal health and must never be used for treatment without advice from a qualified medical or veterinary professional.

Foreword

Antimicrobial resistance (AMR) is one of the most significant human and animal health threats facing our generation and the ones to come. AMR occurs when microorganisms, such as bacteria, that cause infection, become resistant to the medicine used to treat it.

The main cause of AMR is antimicrobial use. Antimicrobial use, specifically antibacterial use, applies selective pressure by killing susceptible bacteria and allowing resistant bacteria to survive and multiply. Inappropriate use of antibacterials across human health, animal health and agriculture globally is responsible for accelerating the development of AMR.

If resistance emerges to an antibacterial agent used to treat a specific infection for which there are no treatment alternatives, the consequences to health outcomes are significant and potentially life threatening.

As such, it is important that antibacterials are used appropriately in order to effectively respond to the threat of AMR in Australia, particularly given that the development of new antibacterials is minimal. As a result, it is essential that we preserve the effectiveness of our existing antibacterials.

The Importance Ratings and Summary of Antibacterial Uses in Human and Animal Health in Australia (Antibacterial Importance Ratings) aim to provide information to inform decision making about the registration and use of antibacterial medicines in Australia.

The Antibacterial Importance Ratings were developed by the Australian Government with expert advice from the Australian Strategic and Technical Advisory Group on AMR (ASTAG).

For more information about AMR and Australia's first *National Antimicrobial Resistance Strategy* 2015-2019, visit <www.amr.gov.au>

The term 'antibacterial' is used in this document as the more common term 'antimicrobial' technically includes agents with other antimicrobial properties (e.g. antifungals), and such agents are not discussed here.

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Version control

The Importance Ratings and Summary of Antibacterial Uses in Human and Animal Health in Australia (the "Antibacterial Importance Ratings") has been reviewed as per the table below.

Version	Reviewed by	Date
1.0	Australian Strategic and Technical Advisory Group on AMR (ASTAG)	June 2018

History of this document

The Antibacterial Importance Ratings was first developed in 2002 by the Expert Advisory Group on Antimicrobial Resistance of the National Health and Medical Research Council.

In 2014, the document underwent revision by the Antimicrobial Resistance Standing Committee of the Australian Health Protection Principal Committee, and in 2015 was further updated by the then newly created ASTAG. The ASTAG develops and provides expert advice on AMR-related issues and includes representatives from across the fields of human health, animal health, food, agriculture and the environment.

The Antibacterial Importance Ratings have undergone significant revision and have been renamed. Changes made since the previous version of the Antibacterial Importance Ratings include:

- consolidation of information on antibacterials registered in Australia and antibacterials not registered in Australia for any purpose into a single table;
- updating of all table information to ensure currency;
- brief comments on the use of antibacterials in animals, including those about off-label use and relevant label restraints;
- comments on the potential for the use of certain antibacterials in animals, which are not used in humans, to select for cross resistance to human medicines;
- an expanded explanation of the Low, Medium and High Importance ratings categories; and
- a revised front section, including Foreword, History of the Document, Background and other information relevant to the use of this document.

About this document

The Antibacterial Importance Ratings provides brief comments on the ways in which registered antibacterials are currently used in human and animal health. The ratings will change over time as resistance levels change, new antibacterials are introduced, and optimum antibacterial choices for therapy and prophylaxis alter because of new evidence relevant to Australia. Consequently the table will be reviewed by ASTAG at regular intervals. Updates will be issued as appropriate.

The Antibacterial Importance Ratings has been revised with an awareness of international documents with a similar purpose including:

- the World Health Organization's (WHO) Critically Important Antimicrobials for Human Medicine, 5th Revision (2016); and
- the World Organisation for Animal Health's (OIE) List of Antimicrobial Agents of Veterinary Importance (2015).

While care has been taken to consider these international lists, this document does differ in some circumstances as the local context is taken into account, including Australian surveillance data and available alternative antibacterials.

The WHO *Critically Important Antimicrobials for Human Medicine* list represents a global list providing a ranking of antimicrobial agents according to their importance in human health, which could be used, especially by countries with limited resources, for risk prioritisation of non-human use of antimicrobial agents. It is noted in the document that implementation of the WHO's list at national levels may vary when national considerations are taken into account.

Please note that the macrolides such as erythromycin and the penicillins such as ampicillin are listed as **critically important** on the WHO *Critically Important Antimicrobials for Human Medicine* list but as **low** importance on the Australian Antibacterial Importance Ratings. The difference in importance rating reflects the relatively low reliance on these antibacterial agents in Australia because resistance is widespread in many human pathogens causing infection in Australia or that some of the pathogens of interest to WHO are less important in Australia.

In addition, although the rating for streptogramins has been reduced from critically important to highly important in the latest iteration of the WHO List, they remain in the highest category (high) in the Australian Importance Ratings. This is because pristinamycin is a reserve agent used for methicillin-resistant Staphylococcus aureus (MRSA) infection in Australia.

To ensure that the Australian context is taken into account, this document has precedence above other lists including the WHO Critically Important Antimicrobials for Human Medicine list.

The WHO recognises that implementation at the national level requires that national considerations be taken into account and may vary from country to country[1].

[1] *Critically Important Antimicrobials for Human Medicine,* 5th Revision, World Health Organization, (2017) available at <www.who.int/foodsafety/publications/antimicrobials-fifth/en>

Purpose

The main purpose of this document is to provide information to regulators and users of antibacterials on their importance in the treatment of infections in animals and humans, and the seriousness of the consequences should resistance emerge or be amplified.

The document provides information on antibacterials used in:

- humans alone;
- animals alone; and
- those agents used in both humans and animals.

This information is important as it provides a comprehensive picture of antibacterial use across all sectors in Australia, and the potential for resistance and cross-resistance to develop. It also helps to identify areas that might require close monitoring and/or intervention.

All agents with significant antibacterial activity are included in this document, even if their primary use is not for treating or preventing bacterial infections. For example, pyrimethamine, a dihydrofolate reductase inhibitor, whose main role is treatment of malaria and toxoplasmosis, has antibacterial activity similar to that of trimethoprim, and therefore has the potential to select for resistance to this class.

This document is relevant to the “severity of impact” of antibacterial resistance, which is an important element to overall risk characterisation. Ratings in this document do not affect other parts of risk assessment including hazard, exposure or probability of disease as a result of exposure.

Other potential uses of this document

This document may also be used:

- As a resource for the education of human health, animal health and pharmacy professionals
- To inform risk assessments for the registration of new antibacterial agents and extensions of indications of currently registered antibacterials
- To inform changes to regulatory arrangements for currently registered antibacterials
- To assist animal sectors in determining the appropriate use of antibacterials
- To direct responses to protect the effectiveness of antibacterials with 'High' importance ratings
- To inform the development of stewardship initiatives, alternative therapies and prescribing guidelines
- To raise the profile of the importance of appropriate antibacterial use generally
- To ensure that surveillance programs include the collection of data relevant to antibacterials of highest importance
- To inform areas for further research and development
- To inform advice provided by ASTAG in relation to the risk to human and animal health posed by exposure to either antibacterials or bacteria that are resistant to them. Such advice may be provided to:
    - the Australian Pesticides and Veterinary Medicines Authority (APVMA)
    - Therapeutic Goods Administration (TGA)
    - Advisory Committee on Medicines Scheduling (ACMS)
    - Advisory Committee on Chemicals Scheduling (ACCS) and
    - the Pharmaceutical Benefits Advisory Committee (PBAC).

Ratings explained

The Antibacterial Importance Ratings table categorises each antibacterial as either of 'High', 'Medium' or 'Low' Importance for the mitigation of antibacterial resistance.

Low Importance: There are a reasonable number of alternative antibacterials in different classes available to treat or prevent most human infections even if antibacterial resistance develops.
Medium Importance: There are some alternative antibacterials in different classes available to treat or prevent human infections, but less than for those rated as Low Importance.
High Importance: These are essential antibacterials for the treatment or prevention of infections in humans where there are few or no treatment alternatives for infections. These have also been termed "last resort" or "last line" antibacterials.

The potential for ALL antibacterials to select for resistance is recognised, not just to the agent itself, but also cross-resistance (to agents from the same or similar classes), and the co-selection of resistance (linked resistances in the same bacterial strain to unrelated antibacterial classes). Cross-resistance is more immediate and a primary consideration for antibacterial classes that might be shared between human and animal health.

In general, it is expected that antibacterials with a High rating would have restricted use in animals producing food for human consumption (which includes cattle, pigs, poultry, sheep, and some horses).

There are currently a small number of antibacterials in the High category that have been, and remain legitimately, registered by the APVMA. The use of antibacterials with High ratings in animals will be considered appropriate when national stewardship guidelines are available, or in 'exceptional circumstances'. For the purposes of this document exceptional circumstances are defined as:

- Based on culture and susceptibility testing, there are no effective alternate agents and the animal is not destined for human consumption.

It is important that all antibacterials are used appropriately regardless of their importance rating because, when resistance emerges to Low and Medium Importance agents, High Importance agents will be required more often. This will accelerate the development of resistance in these agents. All antibacterials are important and efforts must be applied to ensure the prudent and appropriate use of all agents regardless of rating.

Background

Regulation of antibacterial medicines in Australia

The majority of antibacterial medicines used in human and animal health in Australia are Schedule 4 medicines, which means that they are available by prescription only.

Before an antibacterial medicine can be supplied in Australia for human use it must be included on the Australian Register of Therapeutic Goods (ARTG) or approved for use under the Special Access Scheme. All antibacterial medicines on the ARTG are subject to TGA evaluation criteria for safety, quality and efficacy, including risk assessment for the development of resistance. Many antibacterials are subsidised through the Australian Government's Pharmaceutical Benefits Scheme (PBS), which supports affordable access to these important medicines. Varying levels of restriction apply to antibacterials on the PBS, and subsidies are available for specific indications to encourage appropriate use.

Antibacterial medicines for animal use are evaluated and registered by the APVMA under the Agricultural and Veterinary Chemicals Code Act 1994. Each antibacterial is evaluated for quality, safety to humans, the environment and the target host animal, efficacy and trade implications. The safety evaluation includes the management of risks associated with the development of antibacterial resistant organisms in animals that may be transferred to humans. The APVMA is responsible for the regulating the manufacture and the supply of antibacterial veterinary chemical products up to the point of sale. State and territory government agencies are responsible for regulating the supply and use from the point of sale, including the prescription of antibacterial medicines by veterinarians in their respective jurisdictions.

Other reference material

- The Antibacterial Importance Ratings should be used in conjunction with other important reference documents, including:
- *Therapeutic Guidelines: Antibiotic,* version 15, Therapeutic Guidelines Ltd (2014) available at <www.tg.org.au>
- *Veterinary Use of Antimicrobials Critical to Human Health,* Fact Sheet, Australian Veterinary Association (2017) available at <www.ava.com.au/amr>
- *Critically Important Antimicrobials for Human Medicine,* 5th Revision, World Health Organization, (2017) available at <www.who.int/foodsafety/publications/antimicrobials-fifth/en>

Legend

Human health uses

The following codes reflect the current use of these antibacterials in Australia in human medicine.

P: prophylactic use

0 = not recommended for prophylactic use; 1 = rarely used; 2 = moderate use; 3 = frequent or major use.

T: therapeutic use

0 = not used for treatment; 1 = infrequently used for listed indications; 2 = moderate use for listed indications; 3 = used frequently for listed indications.

R = Restriction on use (Pharmaceutical Benefits Scheme or hospitals)

1. = readily available;
2. = some extra rules on use e.g. ‘Restricted benefit’ in the Pharmaceutical Benefits Scheme (PBS) or not listed on the PBS and therefore not subsidised;
3. = higher level of restriction e.g. needs an ‘Authority required’ prescription on the PBS or not listed on the PBS and therefore not subsidised; often restricted use in hospitals;
4. = use severely restricted (e.g. not available for prescription under PBS, available in major hospitals but only with permission from a microbiologist or infectious diseases consultant, or in a special clinic);
5. = not TGA registered but imported under the Special Access Scheme.

Table: Summary of Antibacterial Uses in Human and Animal Health in Australia and Importance to Human Health

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
ß-lactamase inhibitor combinations						
Amoxicillin with clavulanic acid	Medium	P1, T3, R1	Second line agent for respiratory tract infections; role in certain types of skin/soft tissue infections and mixed staphylococcal/Gram-negative infections and aerobic/anaerobic infections.	Yes	Amoxicillin combination with clavulanic acid approved for use in cattle (intramammary only), dogs and cats.	Ampicillin-sulbactam Cefoperazone with sulbactam Ceftazidime with avibactam
Piperacillin with tazobactam, Ticarcillin with clavulanic acid	High	P1, T2, R2	Valuable agents for a range of severe mixed aerobic-anaerobic infections including intra-abdominal infections, aspiration pneumonia, skin/soft tissue infections. Primary agents for *Pseudomonas aeruginosa* neutropenic sepsis.	No	Not registered for use in animals.	
Ceftolozane with tazobactam	High	P0, T1, R4	Multi-resistant Gram-negative infections.	No	Not registered for use in animals.	
Aminoglycosides / Aminocyclitols						
Neomycin	Low	P1, T2, R1	Topical agent for skin infection and gut suppression.	Yes	Approved for use in cattle, sheep, pigs, meat chickens (broilers), replacement pullets, horses, dogs and cats.	Arbekacin Bekanamycin Dibekacin Isepamicin Kanamycin Netilmicin
Framycetin	Low	P1, T2, R1		Yes	Approved for topical ocular and aural use in cattle, sheep, horses, dogs and cats.	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
Gentamicin, tobramycin	Medium	P2, T3, R1	Standard agents in combination for serious and pseudomonal infection. Gentamicin used in combination for endocarditis.	Yes (Gentamicin)	Gentamicin only: approved for use in horses, dogs and cats. All gentamicin products are not for use in animals that may be used for human consumption, which may include horses. Tobramycin is not registered for use in animals.	Ribostamycin Sisomicin Streptoduocin
Amikacin	High	P0, T2, R4	Reserve agents for Gram-negatives resistant to gentamicin and tobramycin, and the drug-resistant *Mycobacterium tuberculosis* infection.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Spectinomycin[3]	Medium	P0, T2, R5	Spectinomycin only used for gonorrhoea (infrequently).	Yes	Approved for use singly or in combination with lincomycin in pigs, meat chickens (broilers), layers, ornamental birds, dogs and cats.	
Streptomycin[3]	Low	P0, T1, R5	Rare use in treatment of TB and enterococcal endocarditis.	Yes	Approved for use in pigs, meat chickens (broilers), layers, dogs, cats and ornamental birds. Note: The differences between streptomycin and dihydrostreptomycin are considered by the APVMA to be small.	
Dihydrostreptomycin	Low	Not used in humans	Not used in humans.	Yes	Used in cattle in combination with novobiocin and neomycin for intramammary treatment. (Dihydro)streptomycin/penicillin combination products are available under APVMA permits issued to veterinarians for control of leptospirosis in cattle, sheep and pigs, campylobacteriosis in bulls and for live cattle for export to countries which require (dihydro)streptomycin injection	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
					prior to shipment. Approved for use in dogs and cats. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Paromomycin[3]	Low	P0, T1, R5	Used for *Cryptosporidium, Entamoeba histolytica* and *Dientamoeba* infection. Has antibacterial activity.	No	Not registered for use in animals.	
Apramycin	Medium	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, pigs and meat chickens (broilers). For use in animals with bacterial infection and enteritis associated with *E. coli* and/or *Salmonella* species. Not used in humans but has potential to select for cross resistance to gentamicin and tobramycin.	
Amphenicols						
Chloramphenicol	Low	P0, T2, R1	Usage largely as topical eye preparation. Occasional need for the treatment of bacterial meningitis.	Yes	Approved for use in dogs and cats. Not for use in livestock species.	Azidamfenicol Thiamphenicol
Florfenicol	Low	Not used in humans	Not used in humans.	Yes	Approved for use in cattle and pigs and for topical aural use in dogs. Not used in humans but has potential to select for cross resistance to human medicines.	
Antileprotics						
Clofazimine	High	P0, T3, R4	Usage predominantly for treatment of leprosy.	No	Not registered for use in animals.	Acedapsone
Dapsone	High	P0, T3, R4	Usage predominantly for treatment of leprosy.	No	Not registered for use in animals.	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
Antimycobacterials						
Isoniazid	High	P2, T3, R4	Primary agent for treatment and prevention of tuberculosis (TB).	No	Not registered for use in animals.	Ethionamide Calcium aminosalicylate Morinamide Sodium aminosalicylate Terizadone Tiocarlide Bedaquiline Delamanid
Ethambutol	High	P1, T3, R4	Primary agent for treatment of TB.	No	Not registered for use in animals.	
Pyrazinamide	High	P1, T3, R4	Primary agent for treatment of TB.	No	Not registered for use in animals.	
Cycloserine	High	P0, T1, R4	Reserve agents for complicated or resistant TB.	No	Not registered for use in animals.	
p-aminosalicylic acid	High	P0, T1, R5	Reserve agents for complicated or resistant TB.	No	Not registered for use in animals.	
Prothionamide	High	P0, T1, R5	Reserve agents for complicated or resistant TB.	No	Not registered for use in animals.	
Capreomycin	High	P0, T1, R5	Rare use in TB.	No	Not registered for use in animals.	
Arsenicals						
Roxarsone, 3-nitro-4-hydroxyphenylarsonic acid, sodium arsanilate	Low	Not used in humans	Not used in humans.	Yes	Roxarsone approved for growth promotion in meat chickens (broilers) and turkeys. Sodium arsanilate approved for injection in horses and dogs, but not as an antibacterial agent. No cross resistance with human medicines.	
Bambermycins						
Flavophospholipol (bambermycin)	Low	Not used in humans	Not used in humans.	Yes	Approved for growth promotion in cattle, pigs, meat chickens (broilers), layers and turkeys. No cross resistance with human medicines.	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
Bicozamycins						
Bicozamycin (bicyclomycin)	Low	Not used in humans	Not used in humans.	No	Not registered for use in animals. No cross resistance with human medicines.	Bicozamycin
Coumermycins						
Novobiocin	Low	Not used in humans	Not used in humans.	Yes	Approved for use in cattle. Currently available in an intramammary preparation (with neomycin and dihydrostreptomycin). No cross resistance with human medicines.	Coumermycin Clorobiocin
Carbapenems						
Imipenem, meropenem	High	P0, T3, R4	Very broad-spectrum reserve agents for multi-resistant and serious Gram-negative and mixed infections.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	Biapenem Panipenem Razupenem Tebipenem
Ertapenem	High	P0,T3, R4	Broad-spectrum reserve agent for multi-resistant and Gram-negative infections.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
1st Generation Cephalosporins						
Cefalexin, cefalotin, cefazolin	Medium	P3, T3, R1	Treatment of minor and staphylococcal infections in penicillin allergic patients. Prophylaxis in orthopaedic and other surgery.	Yes (Cefalexin)	Cefalexin only: approved for use in dogs and cats. Cefalotin and cefazolin are not registered for use in animals.	Cefacetrile Cefadroxil Cefatrizine Cefazedone Ceforanide Cefroxadine Ceftazafur Ceftezole
Cephapirin	Medium	Not used in humans	Not used in humans.	Yes	Approved as an intra-uterine treatment of metritis in cows. Not used in humans but has potential to select for cross resistance to	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
					antibacterials used in humans.	Cephaloglycin Cephaloridine Cephradine
Cephalonium	Medium	Not used in humans	Not used in humans.	Yes	Approved as a dry cow intramammary product and as an ophthalmic ointment in cattle and dogs. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
2nd Generation Cephalosporins						
Cefaclor, cefuroxime-axetil	Medium	P0, T2, R1	Treatment of respiratory infections in penicillin-allergic patients.	Yes (Cefuroxime)	Cefuroxime: Approved as an intramammary treatment in lactating cows. Cefaclor is not registered for use in animals.	Cefamandole Cefonicid Cefotiam Cefprozil Cefroxadine Ceftezole Loracarbef
3rd Generation Cephalosporins						
Ceftriaxone	High	P2, T3, R2	Major agent in severe pneumonia and meningitis. Used in selected cases for treatment of gonorrhoea and alternative for prophylaxis of meningococcal infection.	No	Not registered for use in animals. Used in dogs and cats in exceptional circumstances[∞].	Cefcapene Cefdinir Cefditoren Cefetamet Cefixime Cefmenoxime Cefodizime Cefoselis Cefazopran Cefpiramide Cefpodoxime Ceftizoxime Ceftibuten Latamoxef
Cefotaxime	High	P0, T3, R2	Major agent in severe pneumonia and meningitis.	No	Not registered for use in animals. Used in dogs and cats in exceptional circumstances[∞].	
Ceftiofur	High	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, dogs and horses. **Label restraints:** Do not use for mass medication; individual animal treatment only. Do not use by intramammary, topical	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
					or oral route in food producing animals. Do not use for the treatment of mastitis in dairy cattle. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Cefovecin	High	Not used in humans	Not used in humans.	Yes	Approved for use in dogs and cats. **Label restraints:** Do not use in food producing species of animal or guinea pigs. For use only in dogs and cats where indicated by antibiotic sensitivity testing according to the principles of prudent use. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
4th Generation Cephalosporins						
Ceftazidime and cefepime	High	P1, T3, R3	Restricted role in pseudomonal infection and neutropenic sepsis.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	Cefsulodin Cefoperazone Cefpirome Cefquinome
Anti-MRSA Cephalosporins						
Ceftaroline	High	P1, T1, R3	Restricted role in MRSA infection.	No	Not registered for use in animals.	Ceftobiprole
Cephamycins						
Cefoxitin	Medium	P3, T1, R2	Useful anti-anaerobic activity, major role in surgical prophylaxis.	No	Not registered for use in animals.	Cefbuperazone Cefmetazole Cefminox Cefotetan Flomexef

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
Fosfomycins						
Fosfomycin	High	P0,T1,R5	Multi-resistant Gram-negative infections, especially UTI.	No	Not registered for use in animals.	
Fusidanes						
Sodium fusidate	High	P0, T3, R2	Used in combination therapy with rifampicin for MRSA.	Yes[4]	Approved as a topical treatment of skin infections in dogs and eye infections in dogs and cats. Only appropriate in exceptional circumstances[∞].	
Glycopeptides						
Vancomycin	High	P2, T3, R2	Drug of choice for serious methicillin-resistant staphylococcal infections. Reserve agent for enterococcal infection when there is resistance or penicillin allergy.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	Avoparcin Dalbavancin Oritavancin Norvancomycin Ramoplanin Telavancin
Teicoplanin	High	P1, T1, R4	Substitute for vancomycin if intolerance or outpatient IV therapy.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Glycylcyclines						
Tigecycline	High	P0, T1, R4	Reserve agent for multi-resistant Gram-positives and some multi-resistant Gram-negatives.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Ionophores						
Lasalocid Maduramicin	Low	Not used in humans	Not used in humans.	Yes	Maduramicin and semduramicin approved as anticoccidial agents for	Laidlomycin

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
Monensin Narasin Salinomycin Semduramicin					use in meat chickens (broilers). The other ionophores are approved as anticoccidial agents for meat chickens (broilers), replacement pullets, turkeys and cattle, and as growth promoters in cattle, sheep, pigs and goats. No cross resistance to human agents.	
Lantibiotics						
Nisin	Low	Food additive	This is a permitted food additive (FSANZ). Not used in human therapeutics. No cross resistance to other classes.	No	Not registered for use in animals.	
Lincosamides						
Clindamycin, lincomycin	Medium	P1, T3, R2	Reserved for Gram-positive and anaerobic infections in penicillin-allergic patients. Clindamycin topical used for acne.	Yes	Lincomycin approved for use singly or in combination with spectinomycin in pigs, meat chickens (broilers), layers, ornamental birds, dogs and cats. Clindamycin approved for use in dogs and cats.	Pirlimycin
Lipopeptides						
Daptomycin	High	P0, T1, R4	Reserve agent for serious MRSA and VRE infections.	No	Not registered for use in animals.	
Macrocyclic lactones						
Fidaxomicin	High	P0, T1, R4	Reserve agents for refractory *Clostridium difficile* infection.	No	Not registered for use in animals.	
Macrolides						
Azithromycin	Low	P3, T3, R2	Treatment of *Chlamydia trachomatis* infections. Major agent for treatment	No	Not registered for use in animals. Should not be used off-label except in exceptional circumstances[∞] for	Dirithromycin Flurithromycin

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
			and suppression of atypical mycobacterial infection.		individual animals.	Gamithromycin Josamycin Midecamycin Miocamycin Mirosamycin Rokitamycin Telithromycin Terdecamycin Tildipirosin Troleandomycin Tylvalosin
Clarithromycin	Low	P2, T2, R1	Treatment of minor Gram-positive infections. Major agent for treatment and suppression of atypical mycobacterial infection.	No	Not registered for use in animals. Should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Erythromycin^, roxithromycin	Low	P1, T3, R1	Treatment of minor Gram-positive, *Chlamydia* and *Mycoplasma* infections.	Yes (Erythromycin)	Approved for use in cattle, sheep, pigs and meat chickens (broilers). Roxithromycin is not registered for use in animals.	
Spiramycin[3]	Low	P0,T1,R5	Treatment of toxoplasmosis in pregnancy.	Yes	Approved for use in dogs and cats	
Kitasamycin	Low	Not used in humans	Not used in humans.	No	Not registered for use in animals.	
Oleandomycin	Low	Not used in humans	Not used in humans.	Yes	Approved for use in cows as an intramammary treatment. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Tilmicosin	Low	Not used in humans	Not used in humans.	Yes	Approved for use in pigs and cattle. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Tulathromycin	Low	Not used in humans	Not used in humans.	Yes	Approved for use in pigs and cattle. Approved for treating only respiratory infections in cattle and pigs. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Tylosin	Low	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, pigs, meat chickens (broilers), replacement pullets and turkeys. Note: On 29 March, 2018, the APVMA	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
					cancelled the approval of the growth promotion claim. **Label restraints:** Prior to prescribing [Name of Product] investigate the use of non-antibiotic options. If [Name of Product] is indicated and selected for use, prudent prescribing practices (appropriate dose, duration and frequency to minimise treatment failure while minimising the emergence of AMR) must be adhered to. NOT TO BE USED FOR ANY PURPOSE, OR IN ANY MANNER, CONTRARY TO THIS LABEL. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Monobactams						
Aztreonam	High	P0, T3, R4	Reserve agents for resistant Gram-negative infections or patients with severe ß-lactam allergy.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals..	Carumonam Norcardicin A Tigemonam
Nitrofurans						
Nitrofurantoin	High	P2, T2, R1	Treatment and prophylaxis of urinary tract infections only.	No	Not registered for use in animals. Note: All registrations and approved uses of nitrofurans in food-producing species were cancelled in December 1992. There are no MRLs for nitrofurans.	Furaltadone Nifurtoinol Nitrofural
Furazolidone[3]	High	P0, T1, R5	Reserve treatment for *Helicobacter pylori* infection.	No	Not registered for use in animals. Note: All registrations and approved uses of nitrofurans in food-producing species were cancelled in December	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
					1992. There are no MRLs for nitrofurans.	
Nitrofurazone	High	Not used in humans	Not used in humans.	Yes[4]	Approved as a topical treatment of infections of the skin and ear of horses, dogs and cats. Note: All registrations and approved uses of nitrofurans in food-producing species were cancelled in December 1992. There are no MRLs for nitrofurans. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Nitroimidazoles						
Metronidazole, tinidazole	Medium	P2, T3, R1	Major agents for the treatment and prevention of anaerobic infections in hospitals. Principal agents for the treatment of giardiasis and trichomoniasis.	Yes (Metronidazole)	Tinidazole is not registered for use in animals. Metronidazole is approved for use in horses, dogs, cats and ornamental birds.	Ornidazole
Dimetridazole	Medium	Not used in humans	Not used in humans.	Yes	Approved for use only in breeder caged birds, breeder pigeons and breeder game birds. DO NOT USE in birds intended for human consumption. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Ronidazole	Medium	Not used in humans	Not used in humans.	Yes	Approved for use in ornamental birds and pigeons. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
Orthosomycins						
Avilamycin	Low	Not used in humans	Not used in humans.	Yes	Approved for use in broiler chickens. No cross resistance with human medicines.	
Oxazolidinones						
Linezolid	High	P0, T1, R4	Treatment of multi-resistant Gram-positive infections, especially MRSA and VRE.	No	Not registered for use in animals.	Tedizolid
Antistaphylococcal penicillins						
Flucloxacillin, dicloxacillin	Medium	P3, T3, R1	Standard treatment for *Staphylococcus aureus* infections (not MRSA). Surgical prophylaxis, especially orthopaedics.	No	Not registered for use in animals.	Nafcillin Oxacillin
Cloxacillin	Medium	Not used in humans in Australia	Not used in humans.	Yes	Approved for ocular use in cattle, sheep, horses, dogs and cats and for intramammary use in lactating and dry cows. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Moderate-spectrum penicillins						
Amoxicillin, ampicillin^	Low	P2, T3, R1	Principal role in respiratory tract infections. Widespread IV hospital use in combination for a range of moderate and serious infections. Surgical and endocarditis prophylaxis.	Yes	Amoxicillin approved for use in cattle, sheep, pigs, meat chickens (broilers), replacement pullets, turkeys, horses, dogs and cats. Ampicillin - approved as an intramammary infusion for both dry and lactating cows.	Aspoxicillin Azidocillin Bacampicillin Clometocillin Epicillin Hetacillin Metampicillin

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
						Penamecillin Pivampicillin Propicillin Sultamicillin Talampicillin Temocillin Tobicillin
Narrow-spectrum penicillins						
Benzylpenicillin (pen G), phenoxymethylpenicillin (pen V)	Low	P2, T3, R1	Primary agents in pneumococcal and streptococcal infection.	Yes (Benzyl-penicillin)	Approved for use in pigs, cattle, sheep, horses, dogs and cats.	Phenoxyethylpenicillin (phenethicillin)
Procaine penicillin	Low	P2, T3, R1	Intramuscular – occasional substitute for benzylpenicillin.	Yes	Approved singly or in combination with benzathine penicillin for use in cattle, sheep, pigs, horses, dogs and cats.	
Benzathine penicillin	Low	P3, T3, R1	Intramuscular – syphilis treatment and rheumatic fever prophylaxis.	Yes	Approved in combination with procaine penicillin for use in cattle, sheep, pigs, horses, dogs and cats.	
Penethamate hydriodide	Low	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, sheep, pigs and horses. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Broad-spectrum penicillins						
Piperacillin	Medium	P1, T2, R4	*Pseudomonas aeruginosa* infections	No	Not registered for use in animals.	Azlocillin Carbenicillin Carindacillin Mecillinam Mezlocillin Pivmecillinam Sulbenicillin Temocillin

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
						Ticarcillin
Pleuromutilins						
Tiamulin	Low	Not used in humans	Not used in humans	Yes	Approved for use in pigs and meat chickens (broilers). Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	Valnemulin Lefamulin
Retapamulin	Low	P0, T1, R4	Skin infections.	No	Not registered for use in animals.	
Polymyxins						
Polymyxin B	High	P0, T2, R1	Topical agent with Gram-negative activity.	Yes[4]	Approved for topical ocular and aural use in cattle, sheep, horses, dogs and cats. Only appropriate in exceptional circumstances[∞].	
Colistin	High	P0, T1, R4	Reserve agent for very multi-resistant Gram-negative infection (both inhaled and intravenous).	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Polypeptides						
Bacitracin, gramicidin	Low	P0, T2, R1	Topical agents with Gram-positive activity.	Yes (Bacitracin)	Bacitracin - Approved as an infeed premix for use in meat chickens (broilers) and layers. Approved for topical ocular and aural use in cattle, sheep, horses, dogs and cats. Gramicidin is not registered for use in animals.	Enramycin
Thiostrepton	Low	Not used in humans	Not used in humans.	Yes	Approved for dermal and aural use in dogs and cats. Not used in humans but has potential to select for cross resistance to	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
					antibacterials used in humans.	
Pseudomonic acids						
Mupirocin	Medium	P1, T3, R1	Topical treatment of skin infections and clearance of *S. aureus* nasal carriage (including MRSA).	No	Not registered for use in animals. Should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Quinolones						
Norfloxacin	High	P1, T3, R2	Treatment and prevention of complicated UTI.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	Cinoxacin Danofloxacin Difloxacin Enoxacin Fleroxacin Flumequine Garenoxacin Gemifloxacin Grepafloxacin Lomefloxacin Miloxacin Nalidixic acid Oxolinic acid Pazufloxacin Pefloxacin Pipemidic acid Piromidic acid Prulifloxacin Rosoxacin Rufloxacin Sarafloxacin Sitafloxacin
Ciprofloxacin	High	P2, T3, R3	Major oral agent for the treatment of Gram-negative infections resistant to other agents. Minor role in meningococcal prophylaxis.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Moxifloxacin	High	P0, T3, R4	Restricted role in the management of serious respiratory infections, especially pneumonia in patients with severe penicillin allergy.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Ofloxacin	High	P0, T2, R3	Topical treatment of severe eye infections.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Levofloxacin[3]	High	P0, T1, R5	Reserve treatment for *Helicobacter pylori* infection.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
Enrofloxacin Enrofloxacin+Silver Sulfadiazine	High	Not used in humans	Not used in humans.	Yes	Approved for use in dogs and cats. Not used in humans but has potential to select for cross resistance to antibacterials used in humans. **Label restraints:** Do not use in food producing animals. For use in companion animals where culture and sensitivity testing indicate no suitable alternative. Only appropriate in exceptional circumstances[∞].	Sparfloxacin Temafloxacin Trovafloxacin
Ibafloxacin	High	Not used in humans	Not used in humans.	Yes	Approved for use in dogs and cats. Not used in humans but has potential to select for cross resistance to antibacterials used in humans. **Label restraints:** Do not use in food producing animals. For use in dogs animals where culture and sensitivity testing indicate no suitable alternative. Only appropriate in exceptional circumstances[∞].	
Marbofloxacin	High	Not used in humans	Not used in humans.	Yes	Approved for use in dogs and cats. Not used in humans but has potential to select for cross resistance to antibacterials used in humans. **Label restraints:** Do not use in food producing animals For use in dogs and cats where culture and sensitivity testing indicate no suitable alternative. Only appropriate in exceptional circumstances[∞].	
Orbifloxacin	High	Not used	Not used in humans.	Yes	Approved for use in dogs and cats.	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
		in humans			Not used in humans but has potential to select for cross resistance to antibacterials used in humans. **Label restraints:** Not for use in food producing species. Only appropriate in exceptional circumstances[∞].	
Pradofloxacin	High	Not used in humans	Not used in humans.	Yes	Approved for use in dogs and cats. Not used in humans but has potential to select for cross resistance to antibacterials used in humans. **Label restraints:** Do not use for any purpose, or in a manner, contrary to this label. For use only in dogs and cats which have responded poorly to other classes of antimicrobials and where culture and sensitivity testing indicate no suitable alternative. Only appropriate in exceptional circumstances[∞].	
Quinoxalines						
Carbadox, Olaquindox	Low	Not used in humans	Not used in humans.	Yes (Olaquindox)	Approved for use in pigs (olaquindox only). No evidence for cross resistance to human agents. Carbadox is not registered for use in animals.	
Rifamycins						
Rifampicin (Rifampin)	High	P3, T3, R2	Meningococcal and *H. influenzae* type b prophylaxis. Standard part of TB	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	Rifapentine Rifamycin

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
			regimens. Important oral agent in combination for MRSA infections.			
Rifabutin	High	P3, T2, R4	Treatment and prophylaxis of *Mycobacterium avium* complex infections.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Rifaximin	High	P1, T0, R4	Prevention of hepatic encephalopathy.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Sulfonamides and dihydrofolate reductase inhibitors						
Sulfadiazine[3]	Low	P0, T3, R5	Treatment of acute toxoplasmosis.	Yes	Approved for use in cattle, sheep, pigs, meat chickens (broilers), turkeys, horses, dogs and pigeons in combination with trimethoprim. Also approved for use in aquarium fish when combined with sulfadimidine and sulfamerazine.	Baquiloprim Brodimoprim Iclaprim Ormetoprim Pyrimethamine Sulfachlorpyridazine Sulfadimerazin Sulfadimethoxazole Sulfadimethoxine Sulfafurazole = sulfisoxazole Sulfaguanidine Sulfaisomidine Sulfalene Sulfamazone Sulfamethazine Sulfamethizole Sulfamethoxazole (alone) Sulfamethoxine
Silver sulfadiazine	Low	P3, T1, R1	Prevention of wound infections, especially in burns.	Yes	Approved for aural use in dogs in combination with enrofloxacin (High, refer to enrofloxacin entry).	
Trimethoprim	Low	P2, T3, R1	Treatment and prophylaxis of UTI.	Yes	Approved for use in cattle, sheep, pigs, meat chickens (broilers), turkeys, horses, dogs and pigeons in combination with other sulphonamides, which all rate as Medium.	
Sulfamethoxazole-trimethoprim (co-trimoxazole)	Medium	P2, T3, R1	Minor infections, especially treatment and prophylaxis of UTI. Standard for treatment and prophylaxis of *Pneumocystis jiroveci*	No	Not registered for use in animals.	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
			infection and nocardiasis. Important for community-acquired MRSA infections.			Sulfamethoxypyridazine Sulfametomidine Sulfamethoxydiazine Sulfametrole Sulfamonomethoxine Sulfamoxole Sulfanilamide Sulfaperin Sulfaphenazole Sulfapyridine Sulfathiourea Tetroxaprim Ormosulfathiazole
Sulfadoxine-pyrimethamine	Medium	P1, T1, R3	Treatment and prophylaxis of malaria.	No	Not registered for use in animals.	
Sulfadoxine-trimethoprim	Medium	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, sheep, pigs, goats, horses, dogs and cats. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Sulfadiazine-trimethoprim	Medium	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, sheep, pigs, broiler chickens, turkeys, pigeons, horses, dogs and cats. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Sulfadimidine-trimethoprim	Medium	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, sheep, pigs, broiler chickens, horses, dogs and cats. Sulfadimidine alone is approved for use in aquarium fish and ornamental caged birds. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Proguanil	Low	P2, T1, R3	Malaria prophylaxis.	No	Not registered for use in animals.	
Pyrimethamine	Low	P0, T3, R1	Treatment of toxoplasmosis.	No	Not registered for use in animals.	
Sulfacetamide	Low	Not used in humans	Not used in humans.	Yes	Approved for ocular and aural use in horses, dogs and cats. Not used in humans but has potential to select for cross resistance to	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
					antibacterials used in humans.	
Sulfadimidine	Low	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, sheep, pigs, meat chickens (broilers), horses, dogs, cats and ornamental birds in combination with trimethoprim. Also approved for use in aquarium fish when combined with sulfadiazine and sulfamerazine. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Sulfaquinoxaline	Low	Not used in humans	Not used in humans.	Yes	Approved as an anticoccidial agent for use in meat chickens (broilers). Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Sulfamerazine	Low	Not used in humans	Not used in humans.	Yes	Approved for use in ornamental birds when combined with sulfadimidine and sulfathiazole and for use in aquarium fish when combined with sulfadimidine and sulfadiazine. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Sulfathiazole	Low	Not used in humans	Not used in humans.	Yes	Approved for use in ornamental birds when combined with sulfadimidine and sulfamerazine. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Phthalylsulfathiazole	Low	Not used in humans	Not used in humans.	Yes	Approved for use in dogs and cats. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Sulfathiazole	Low	Not used	Not used in humans.	Yes	Approved for use in ornamental birds	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
		in humans			when combined with sulfadimidine and sulfamerazine. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Streptogramins						
Quinupristin with dalfopristin	High	P0, T1, R5	Multidrug-resistant Gram-positive infections, especially those caused by *E. faecium*	No	Not registered for use in animals.	
Pristinamycin[3]	High	P0, T1, R5	As for quinupristin-dalfopristin as well as MRSA.	No	Not registered for use in animals and should not be used off-label except in exceptional circumstances[∞] for individual animals.	
Virginiamycin	High	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, sheep, meat chickens (broilers) and horses. Not used in humans but has potential to select for cross resistance to antibacterials used in humans. **Label restraints:** Not to be used for any purpose, or in a manner, contrary to this label. Do not feed to laying birds. Do not use in horses that may be slaughtered for human consumption. Prudent use: Prior to using [virginiamycin] investigate the use of non-antibiotic options. If virginiamycin is indicated and selected for use, prescription must be consistent with the AVA *Code of Practice for Prescription and Use of Products which Contain Antimicrobial Agents*. Dosage regimens should be designed for each situation with an appropriate	

Antibacterial class and antibacterial	Australian Importance Rating[1]	Human health uses P, T, R	Brief comments on human use[2]	APVMA registered	Brief comments on animal use[5]	Not registered in Australia by TGA or APVMA for any purpose
					duration and frequency to minimise treatment failure while minimising the emergence of resistance. Review farm records on the use of product containing virginiamycin to ensure compliance with prescribing instructions.	
Tetracyclines						
Tetracycline, doxycycline, minocycline	Low	P2, T3, R1	Major agents for minor respiratory tract infections and acne. Supportive role in pneumonia for treating *Mycoplasma* and *Chlamydia pneumoniae.* Malaria prophylaxis (doxycycline).	Yes	Tetracycline approved for use in ornamental birds and aquarium fish. Doxycycline approved for use in dogs, cats, ornamental birds and pigeons. Minocycline is not registered for use in animals.	Clomoclocycline Demeclocyline Lymecycline Metacycline Minocycline Penimepicycline Rolitetracycline
Chlortetracycline	Low	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, pigs, meat chickens (broilers), layers, dogs, cats and ornamental birds. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	
Oxytetracycline	Low	Not used in humans	Not used in humans.	Yes	Approved for use in cattle, sheep, goats, pigs, meat chickens (broilers), horses, dogs, cats, bees and ornamental birds. Not used in humans but has potential to select for cross resistance to antibacterials used in humans.	

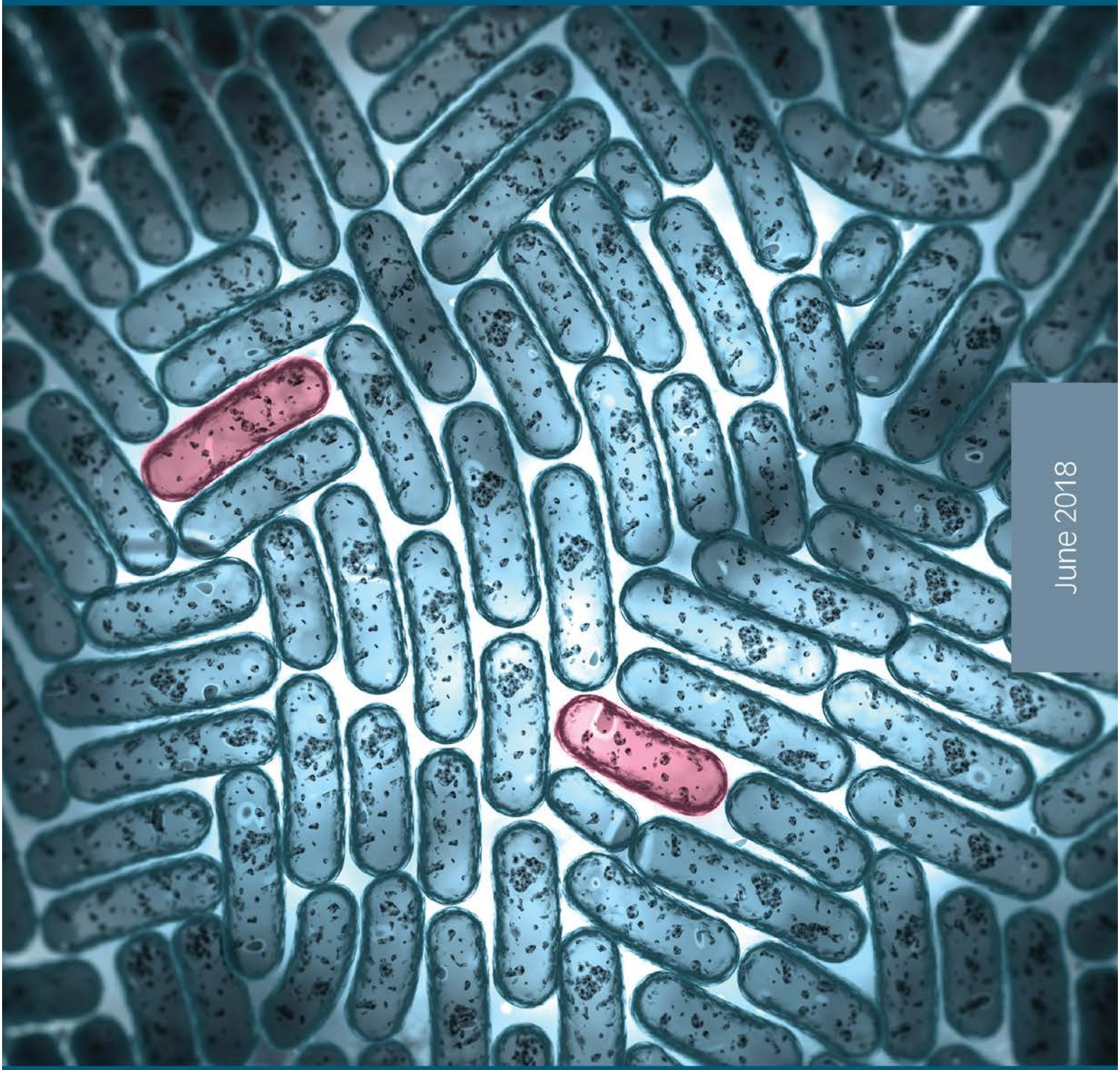
Abbreviations:

MRSA methicillin-resistant *Staphylococcus aureus*

TB tuberculosis

UTI urinary tract infections

VRE vancomycin-resistant *Enterococcus* species



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All information in this publication is correct as at June 2018

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