**[ENTER CLINIC NAME]**

**Veterinary Antimicrobial Stewardship Program**

[This document can be adapted to suit your clinic. We recommend maintaining the essence of the document as this represents the best adaption of the evidence to date.]

**PURPOSE:**

To comply with evidence-based guidelines or best practices regarding antimicrobial prescribing and promote rational and appropriate antimicrobial therapy while improving clinical outcomes and minimising unintentional side-effects of antimicrobial use, including emergence of resistant microorganisms.

The program is based on the [ACSQHC Antimicrobial Stewardship in Australian Hospitals](https://www.safetyandquality.gov.au/wp-content/uploads/2012/02/Antimicrobial_stewardship_prelim_execsummary.pdf) in medical practice and a [2015 systematic review of antimicrobial stewardship in outpatient settings](https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/antimicrobial-stewardship-in-outpatient-settings-a-systematic-review/B3C4F4986ADAF043888ADC661B0D9874) and has been adapted by the University of Melbourne to reflect practicalities in veterinary practice in Australia. The outcomes (www.fvas.unimelb.edu.au/vetantibiotics) and impact of the program should be tracked by clinic management to ensure implementation of the program.

 [This document outlines the structure recommended for antimicrobial stewardship in veterinary practices. You may choose a program level or individual aspects of the program from different levels. Detailed explanations of the program components can be found on subsequent pages of this document. Use the checklist on the next page to select the components to be implemented in your practice. We strongly recommend choosing at least 5 components. We have outlined three possible programs in Table1. The Bronze program reflects a level of specialist knowledge and access to essential resources. The Silver program includes appointment of an antimicrobial stewardship champion and active use of several interventions. The Gold program includes all of the features of Bronze and Silver programs but includes additional monitoring, review and feedback procedures. ]

Table 1. Suggested outline of 3 levels of antimicrobial stewardship program

|  |  |  |  |
| --- | --- | --- | --- |
|  **Program tools****Program level** | **Resources** | **Education** | **Active interventions** |
| Bronze | Antimicrobial use guidelines. | Participation in continuing education on antimicrobial use by at least one veterinarian on staff annually. | Understand the principles of judicious antimicrobial use.Knowledge of, and access to, antimicrobial use guidelines |
| Silver | Antimicrobial use guidelines.Antimicrobial stewardship champion appointed.  | Education of staff at induction.Participation in continuing education on antimicrobial use by one or more veterinarians on staff annually.Educate clients on judicious antimicrobial use in animals. | Follow antimicrobial use guidelines.Understand and follow principles of judicious antimicrobial use.Institue a traffic-light system for antimicrobial use.Institute diagnostic testing guidelines. |
| Gold | All of the recommendations for silver and:Local guidelines for antimicrobial use. | All of the recommendations for silver and:Participation in continuing education on antimicrobial use by half of all veterinarians on staff annually.Education of staff at induction and, at least, annually thereafter.All clinic meetings to include antimicrobial stewardship as an agenda item.  | All of the recommendations for silver and:Institute audit and feedback procedures.Restrict access to antimicrobials with high-importance rating.Utilise delayed prescribing.Monitor antimicrobial resistance and antimicrobial use. |

**ELEMENTS OF VETERINARY ANTIMICROBIAL STEWARDSHIP PROGRAM**

**INTERVENTIONS [select at least five interventions]**

* Follow antimicrobial use guidelines
* Implement clinic policy on antimicrobial use
* Appoint antimicrobial stewardship champion
* Use a traffic-light system for antimicrobial use
* Use diagnostic testing guidelines
* Restrict access to antimicrobials with high-importance rating
* Use delayed prescribing
* Monitor antimicrobial use
* Monitor antimicrobial resistance
* Other [**specify**]

**EDUCATION [select at least one education strategy]**

* Education of staff about antimicrobial use and clinic policies at induction and, at least, annually thereafter
* Participation in continuing education on antimicrobial use by one or more staff veterinarians annually
* Educate clients on judicious antimicrobial use in animals
* All clinic meetings to include antimicrobial stewardship on the agenda
* Other [**specify**]

**RESOURCES [select resources that will be available for staff and where they can be accessed]**

* Antimicrobial use guidelines
* Antimicrobial stewardship champion
* Clinic policy for antimicrobial use
* Other [**specify**]

***\*\*Biosecurity policies SHOULD ALSO BE IMPLEMENTED***

A biosecurity policy and procedures document should be produced and accompany this document. The AVA produces [guidelines](http://www.ava.com.au/sites/default/files/Guidelines-for-veterinary-personal-biosecurity-2017-FINAL.pdf).

**RESOURCES:**

**Antimicrobial Guidelines & judicious antimicrobial use**

*Bronze:*

A copy of the antimicrobial guidelines will be available for all staff. The poster for companion animal practices and booklets or posters for large animal practices (resources available at [www.fvas.unimelb.edu.au/vetantibiotics)](http://www.fvas.unimelb.edu.au/vetantibiotics%29) will be available. Judicious use of antimicrobials will be promoted at staff meetings.

*Silver:*

As above **AND** the antimicrobial stewardship champion, in consultation with all participating veterinarians, will utilise the guidelines to develop recommendations that shall be populated in the poster for companion animal practices and in booklets or posters for large animal practices (resources available at www.fvas.unimelb.edu.au/vetantibiotics). Judicious use of antimicrobials will be promoted at staff meetings.

*Gold:*

As above **AND** the antimicrobial stewardship champion, in consultation with all participating veterinarians, will utilise evidence-based practice protocols and guidelines to develop clinic protocols for antimicrobial use. Recommendations shall be populated in the poster for companion animal practices and in booklets or posters for large animal practices (resources available at www.fvas.unimelb.edu.au/vetantibiotics). The antimicrobial stewardship champion should access antibiograms, if these are available, to guide updates to practice protocols. Judicious use of antimicrobials will be promoted at staff meetings.

**Antimicrobial stewardship champion**

*Silver & Gold:*

The antimicrobial stewardship champion will be a practice owner, or a senior veterinarian with the support of the practice owners. The antimicrobial stewardship champion should be trained in antimicrobial stewardship.

**Educational Activities**

*Bronze:*

At least one veterinarian on staff will participate in continuing education about judicious use of antimicrobials annually.

*Silver:*

One or more veterinarians on staff will participate in continuing education about judicious use of antimicrobials annually. Education of staff regarding evidence-based guidelines or best practices including antimicrobial management should occur at induction.

*Gold:*

Half of all veterinarians on staff will participate in continuing education about judicious use of antimicrobials annually. Education of staff regarding evidence-based guidelines or best practices including antimicrobial management should occur at induction and, at least, annually thereafter. All clinic meetings should include antimicrobial stewardship as an agenda item.

**Client education**

*Silver & gold:*

The practice manager or antimicrobial stewardship champion will display educational posters in reception areas to educate clients on responsible use of antimicrobials. In addition, literature such as flyers will be available to assist veterinarians to explain antimicrobial resistance and the reasons when antimicrobials may not be prescribed. All veterinarians will commit to educating clients about responsible and prudent use of antimicrobials for their animals.

**Traffic-light system for antimicrobials**

*Silver & gold:*

The antimicrobial stewardship champion will coordinate colour coding of antimicrobials held in the pharmacy, either by application of a coloured sticker or by colour coding of the shelves where antimicrobials are stored. Recommended classification of antimicrobials can be found in table 1.

The antimicrobial stewardship champion will add additional antimicrobials to the list as they become available in the veterinary clinic.

Table 1. Traffic light system for antimicrobials used in veterinary medicine (based on Australian Strategic Technical Advisory Group on AMR antimicrobial rating system)

|  |  |  |
| --- | --- | --- |
| **GREEN: FIRST CHOICE****(LOW IMPORTANCE RATING)** | **ORANGE: SECOND LINE****(MEDIUM IMPORTANCE RATING)** | **RED: ONLY AFTER C & S\*****(HIGH IMPORTANCE RATING)** |
| Penicillins *Benzyl penicillin* *Procaine penicillin* *Benzathine penicillin* *Amoxycillin* *Ampicillin* | Penicillins *Amoxycillin / clavulanate*  *Cloxaxillin* *Dicloxacillin* *Flucloxacillin* | Penicillins Piperacillin / tazobactam Ticarcillin / clavulanate |
|  |  |  |
| Tetracyclines *Tetracycline* *Doxycycline* *Minocycline* | 1st Generation Cephalosporins *Cephalexin* *Cephalothin* *Cefazolin*2nd Generation Cephalosporins *Cefaclor* *Cefoxitin* | 3rd Generation Cephalosporins *Cefovecin*  *Ceftiofur* *Ceftriaxone* *Cefotaxime*4th Generation Cephalosporins *Ceftazidime* *Cefapime* *Ceftaroline* |
|  |  |  |
| Aminoglycosides *Neomycin* *Streptomycin* | Aminoglycosides *Gentamicin* *Tobramycin* *Spectinomycin* | Aminoglycosides *Amikacin* |
|  |  |  |
| Sulphonamides *Sulfadiazine* *Silver sulfadiazine* *Sulfacetamide* *Trimethoprim /*  *sulfamethoxazole* *Sulfadoxine / pyrimethamine* | Lincosamides *Clindamycin*  *Lincomycin* | Fluoroquinolones *Enrofloxacin* *Ciprofloxacin* *Marbofloxacin* *Pradofloxacin* *Ofloxacin* |
|  |  |  |
| Macrolides *Azithromycin* *Clarithromycin* *Erythromycin* | Nitroimidazoles *Metronidazole* | Glycopeptides *Vancomycin* *Teicoplanin* |
|  |  |  |
| Polypeptides *Bacitracin* | Pseudomonic acids *Mupirocin* | Carbapenems *Imipenem* *Meropenem* |
|  |  |  |
| Amphenicols *Chloramphenicol* |  | Monobactams *Aztreonam* |
|  |  | Antimycobacterials *Isoniazid* |
|  |  | Rifamycins *Rifampicin* |
|  |  | Polymixins *Polymixin B* *Colistin* |

\* Or if compelling reason to use pending C & S

**Diagnostic testing**

*Silver & gold:*

All veterinarians will use diagnostic testing when indicated in the guidelines for discernment between diseases with a bacterial origin and those without a bacterial origin. Cases that do not have evidence of a bacterial cause will not be treated with antibiotics unless substantial mitigating factors exist; these will then be documented in the clinical record.

Culture and susceptibility testing will be performed prior to prescribing antimicrobials for:

* All cases of suspected urinary tract infection (along with cytological examination)
* Any case that does not respond to empirical therapy
* Any case where an antimicrobial with a high importance rating is used empirically
* Any case where infection is life-threatening (e.g. sepsis, septic arthritis, meningitis)
* [add others as appropriate]

Cytology will be performed prior to prescribing antimicrobials for:

* All dermatological & otitis cases
* All cases of suspected urinary tract infection
* All cases of suspected synovial sepsis
* All cases of suspected pleuritis, peritonitis or pneumonia
* [add others as appropriate]

Patient side tests will be performed prior to prescribing antimicrobials for:

* All cases of neonatal calf diarrhoea
* [add others as appropriate]

**Audit & feedback**

*Gold:*

The antimicrobial stewardship champion shall review antimicrobial prescribing for recent graduates and new team members using the MIND-ME principle:

**M**Microbiology should guide therapy where possible

**I**Indications should be evidence-based and include a bacterial cause in most instances

**N**  Narrowest spectrum possible

**D**  Dosage appropriate to species, site and type of infection (label not always accurate)

**M**  Minimise duration of therapy

**E** Ensure monotherapy wherever possible (one drug rather than combinations of drugs)

**All veterinarians shall** review culture & susceptibility reports and consider potential adjustments to antimicrobial regimens. De-escalation should be considered, which involves switching from drugs with a high importance rating to those with a low or medium importance rating if susceptibility testing indicates their effectiveness, or shifting from broad spectrum to narrow spectrum therapy once a causative agent has been identified. Escalation of therapy may also be required, if empirical antimicrobial therapy is not effective against the causative agent identified on culture. Consultation with a microbiologist may be required and should be considered in any case where the organism was unexpected or has an unusual susceptibility pattern.

**Delayed prescribing**

*Gold:*

All veterinarians will use delayed prescribing for conditions where there is no evidence that antimicrobials are immediately necessary and other therapies such as topical therapy or anti-inflammatories have been prescribed. Should effective treatment fail with these, antimicrobial therapy would then be indicated. Repeat consultation may be an alternative in some circumstances, but where client finances do not allow for repeat consultation, delayed prescribing is an acceptable alternative. Delayed prescribing typically gives patients a 2-day delay on a prescription, so if symptoms persist or worsen antimicrobials can be obtained.

**Antimicrobial class restriction**

*Gold:*

A list of restricted antimicrobials shall be made available to all veterinarians with permission for use required from the antimicrobial stewardship champion or [insert names of others as required] before their use.

Alternatively a primary list of restricted antimicrobials shall be made available to all veterinarians with permission for use required from the antimicrobial stewardship champion or [insert names of others as required] before their use, and a secondary list of restricted antimicrobials shall be made available with use only allowed if samples are submitted for culture and susceptibility testing prior to initiating therapy. Recommended classification of antimicrobials for restriction can be found in table 2.

Utilisation of the following antimicrobials will be reviewed annually and presented to all veterinarians in a clinic meeting.

Table 2. Restricted antimicrobials

|  |
| --- |
| **Restricted Antimicrobials [CAN BE ADAPTED TO INDIVIDUAL CLINICS]** |
| **Permision required** | **Use allowed if samples for C&S collected prior to starting therapy** |
| Piperacillin/tazobactam (Piptaz®) | Amikacin |
| Ceftaroline (Teflaro®) | Ticarcillin/clavulanate (Timentin®) |
| Colistimethate IV (Colistin®) | Tigecycline (Tygacil®) |
| Daptomycin (Cubicin®) | Ceftriaxone |
| Cefotaxime, Ceftazidime, Cefapime, Cefotaxime, Ceftazidime, Ceftriaxone | Enrofloxacin, Moxifloxacin, Pradofloxacin, Ciprofloxacin |
| Linezolid (Zyvox®) / Tedizolid (Sivextro®) | Rifampicin |
| Meropenem (Merrem®) / Imipenem (Primaxin®) / Doripenem (Doribax®), Ertapenem (Invanz®) | Cefovecin (Convenia®) |
| Aztreonam | Polymixin B (IV) |
| Vancomycin | Ceftiofur (Accent®, Excenel®, Excede®) |
| Tiecoplanin |  |
| Norfloxacin, Ofloxacin, Levofloxacin |  |
| Isoniazid |  |

\**Proposed list of restricted antimicrobials.*

**Surveillance**

*Gold:*

Antimicrobial resistance

All veterinarians shall report antimicrobial resistance to the antimicrobial stewardship champion. The antimicrobial stewardship champion will record all occurences of resistance, and collate susceptibility patterns to ensure early detection of emergence of drug resistant organisms. Any resistant microbial pathogens that appear to have similar susceptibility profiles may represent nosocomial transmission and warrant prompt investigation and documentation.

Antimicrobial use

The antimicrobial stewardship champion will record the case details, indication for use, dose, duration of therapy and outcome of all cases treated with restricted antimicrobials.