

# Are you **PROTECT**ing your antibacterials?



## Practice policy

- A practice policy for empirical prescribing (whilst awaiting cultures) can optimize therapy, and minimize inappropriate use of antibacterials

## Reduce prophylaxis

- Antibacterials are **not** a substitute for surgical asepsis
- Prophylactic antibacterials are only appropriate in a few medical cases (e.g. immunocompromised patients)

## Other options

- Reduce inappropriate antibacterial prescribing (e.g. due to client pressure, in uncomplicated viral infections or self-limiting disease) by providing symptomatic relief (e.g. analgesia, cough suppressants)
- Use cytology and culture to diagnose bacterial infection correctly
- Effective lavage and debridement of infected material reduces the need for antibacterials
- Using topical preparations reduces selection pressure on resistant intestinal flora

## Types of bacteria and drugs

- Consider which bacteria are likely to be involved, e.g. anaerobic/aerobic, Gram +ve versus Gram -ve
- Consider the distribution and penetration of the drug
- Consider any potential side effects

## Employ narrow spectrum

- It is better to use narrow-spectrum antibacterials as they limit effects on commensal bacteria
- Avoid using certain antibacterials as first line agents; only use when other agents are ineffective (ideally determined by culture and sensitivity testing)

## Culture and sensitivity

- Culture promptly when prolonged courses are likely to be needed (e.g. pyoderma, otitis externa, deep/surgical wound infection) or when empirical dosing has failed

## Treat effectively

- Treat long enough and at a sufficient dose – **and then stop**
- Avoid underdosing
- Repeat culture after long courses



Write your practice policy on empirical antibacterial use in the boxes below

### Periodontal disease

amoxicillin OR amoxicillin/clavulanate OR ampicillin OR clindamycin OR metronidazole + spiramycin. With or without chlorhexidine mouthwash.

Practice Policy:

### Respiratory infections

#### Bacterial pneumonia (including aspiration):

- cats: amoxicillin/clavulanate OR doxycycline.
- dogs: aminoglycoside\* + metronidazole\* OR amoxicillin + fluoroquinolone OR amoxicillin + metronidazole\* OR doxycycline OR oxytetracycline.

Practice Policy:

#### Bacterial rhinitis, chronic rhinitis and sinusitis: amoxicillin/clavulanate

Practice Policy:

#### Kennel cough: no antimicrobials in mild cases; more severe: amoxicillin/clavulanate OR doxycycline OR oxytetracycline.

Practice Policy:

#### Suspected *Mycoplasma*:

- cats: azithromycin\* OR doxycycline.
- dogs: azithromycin\* OR doxycycline OR oxytetracycline.

Practice Policy:

#### Pyothorax:

- cats: amoxicillin/clavulanate
- dogs: ampicillin + fluoroquinolone OR clindamycin + fluoroquinolone OR metronidazole\* + fluoroquinolone.

Practice Policy:

### Gastrointestinal infections

#### Acute diarrhoea with complications: amoxicillin/clavulanate OR 1st generation cephalosporin.

Practice Policy:

#### Anal sacculitis: lavage plus topical installation (saline or chlorhexidine); amoxicillin/clavulanate.

Practice Policy:

#### Confirmed *Campylobacter* (if clinically significant): enrofloxacin OR erythromycin\*.

Practice Policy:

#### Cholangitis/cholangiohepatitis: amoxicillin OR amoxicillin/clavulanate OR ampicillin OR cefalexin. Metronidazole\* may be added in dogs.

Practice Policy:

#### Gastrointestinal bleeding or bacterial translocation: metronidazole\* + amoxicillin/clavulanate OR metronidazole\* + 1st generation cephalosporin. Add fluoroquinolones or aminoglycosides\* to improve Gram -ve cover.

Practice Policy:

#### Suspected *Helicobacter*: amoxicillin + metronidazole\* OR azithromycin\* + tindazole OR clarithromycin\* + metronidazole\*. In combination with bismuth (*caution in cats*) OR famotidine OR omeprazole OR ranitidine.

Practice Policy:

### Genitourinary infections

#### Cystitis: amoxicillin/clavulanate OR trimethoprim/sulfadiazine. Many cats with cystitis do not have bacterial infections – routine antibacterials not required.

Practice Policy:

#### Endometritis/Pyometra: amoxicillin/clavulanate OR trimethoprim/sulfadiazine.

Practice Policy:

#### Suspected *Leptospira*: ampicillin OR penicillin G; doxycycline for carriers. Aminopenicillins treat bacteraemia but do not address carrier state.

Practice Policy:

#### Prostatitis (acute): fluoroquinolones OR trimethoprim/sulfadiazine. Culture required in chronic cases.

Practice Policy:

#### Pyelonephritis (acute): trimethoprim/sulfadiazine. Culture required in chronic cases.

Practice Policy:

#### Struvite urolithiasis (dog): amoxicillin/clavulanate OR trimethoprim/sulfadiazine.

Practice Policy:

### Orthopaedic infections

#### Discospondylitis/Osteomyelitis: amoxicillin/clavulanate OR 1st generation cephalosporin OR clindamycin. Long courses (6–8 wk) may be needed.

Practice Policy:

#### Septic arthritis: amoxicillin/clavulanate OR 1st generation cephalosporin.

Practice Policy:

### Skin infections

#### Bite and other traumatic wounds: Lance, debride and lavage. In cat bites amoxicillin first choice; otherwise choice as for Pyoderma. Heavily infected/deeper injuries: metronidazole OR amoxicillin/clavulanate + fluoroquinolone are appropriate while awaiting culture results.

Practice Policy:

#### Infected traumatic wound: amoxicillin/clavulanate OR 1st generation cephalosporin.

Practice Policy:

#### Pyoderma:

Empirical choice of antibacterials suitable for surface and superficial pyoderma (if no resistance or treatment failure) but culture required for deep pyodermas.

- **Topical:** chlorhexidine AND/OR fusidic acid OR silver sulfadiazine\*. (Antifungals for concurrent *Malassezia* often useful.)

- **Systemic:** amoxicillin/clavulanate OR cefadroxil OR cefalexin OR cefovecin (if problems expected with administration/compliance) OR clindamycin OR fluoroquinolones (if others inappropriate). Continue 1 week beyond resolution of clinical signs.

Practice Policy:

#### Pyoderma (idiopathic recurrent):

- **Topical therapy** important: antimicrobial shampoos/rinses, especially chlorhexidine.

- **Systemic:** Alternatives to antibacterials include immunostimulants (Staph Phage Lysate, autogenous vaccine). Last resort is pulse therapy 2–3 consecutive days/wk.

Practice Policy:

#### Pyoderma (confirmed MRSA/MRSP): choice based on sensitivity. If sensitivity not known, use topical chlorhexidine AND/OR fusidic acid OR systemic tetracyclines OR trimethoprim/sulfadiazine.

Practice Policy:

#### Pyogranuloma: as for Pyoderma but *culture essential and may need to be repeated*. Filamentous bacteria: clindamycin OR doxycycline OR trimethoprim/sulphonamide. Mycobacteria: fluoroquinolones ± doxycycline.

Practice Policy:

### Ear infections

#### Otitis externa (erythroceruminous):

- **Topical:** fusidic acid OR framycetin OR gentamicin OR marbofloxacin OR orbifloxacin OR polymyxin B/miconazole. (Antifungals to treat concurrent *Malassezia* will often be useful.) Combine with effective antibacterial ear cleaners with a low pH (chlorhexidine, chloroxylenol, isopropyl alcohol, PCMX.)
- **Systemic:** choice as for Pyoderma.

Practice Policy:

#### Otitis externa (suppurative) or otitis media:

- **Topical:** Choice (including ear cleaners) as for erythroceruminous OE. Enrofloxacin, marbofloxacin, aqueous gentamicin appear to be safe in the middle ear. Multidrug-resistant infections: 1.7% ceftazidime OR 2.8% clavulanate/ticarcillin OR 0.6% enrofloxacin OR 0.2% marbofloxacin OR 0.1–0.5% silver sulfadiazine (diluted in trisEDTA).
- **Systemic:** choice as for Pyoderma.

Practice Policy:

### Eye infections

#### Bacterial conjunctivitis:

- **Topical:** cloxacillin OR fusidic acid OR gentamicin.

Practice Policy:

#### Suspected *Chlamydia*:

- **Systemic:** doxycycline OR enrofloxacin. Topical fusidic acid may be added if desired.

Practice Policy:

### Miscellaneous

#### Endocarditis: amoxicillin/clavulanate + enrofloxacin OR amoxicillin/clavulanate + metronidazole\*.

Practice Policy:

#### Mastitis: amoxicillin/clavulanate OR trimethoprim/sulfadiazine.

Practice Policy:

#### Suspected *Mycoplasma haemofelis* (formerly *Haemobartonella*) (feline infectious anaemia): doxycycline OR fluoroquinolone.

Practice Policy:

#### Neutropenia: Mild: no antibacterial required. Severe but asymptomatic: trimethoprim/sulphonamide. Severe and with clinical signs: 1st generation cephalosporin + fluoroquinolone.

Practice Policy:

#### Septic peritonitis: amoxicillin/clavulanate OR ampicillin + cefotaxime OR ampicillin + gentamicin\* OR clindamycin + enrofloxacin OR fluoroquinolone + ampicillin. Add metronidazole\* if anaerobe suspected.

Practice Policy:

#### Septicaemia: ampicillin + cefotaxime OR ampicillin + gentamicin\* OR clindamycin + enrofloxacin OR enrofloxacin + ampicillin OR fluoroquinolone + amoxicillin/clavulanate.

Practice Policy:



For further information on individual drugs and dosages, see *BSAVA Small Animal Formulary, 7th edition*.

### Surgical prophylaxis

#### Prophylactic antimicrobial use is not a substitute for good aseptic technique.

- Perioperative antibiotic use is appropriate:
  - for prolonged surgery (>1.5 hours) or surgery involving implants
  - for debilitated or immunosuppressed patients
  - where infections would be catastrophic (e.g. in CNS)
  - where there is an obvious break in asepsis
  - for all bowel surgery
  - for dental procedures where there is periodontal disease
  - for contaminated wounds or pre-existing infection.
- In most cases:
  - intravenous amoxicillin/clavulanate OR first-generation cephalosporin.
- Where anaerobic involvement is highly likely (e.g. periodontal disease):
  - *add or substitute* metronidazole.
- For significant bowel leakage in an otherwise metabolically stable animal:
  - combination may be most appropriate, e.g. ampicillin + aminoglycoside (e.g. gentamicin)
  - if patient volume-depleted, replace aminoglycoside with fluoroquinolone.

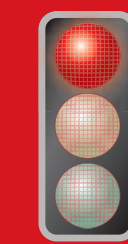
Practice Policy:

### Antibacterials not indicated unless cytology and/or culture is positive

- Cardiorespiratory
  - Chronic bronchitis/allergic airway disease
  - Aspergillosis
  - Congestive heart failure
- Urinary
  - Feline lower urinary tract disease (including struvite urolithiasis)
  - Urinary incontinence
- Gastrointestinal
  - Acute vomiting (uncomplicated)
  - Acute diarrhoea (uncomplicated)
  - Chronic gastroenteritis (unless 4-week treatment trial for antibiotic-responsive diarrhoea)
  - Pancreatitis (uncomplicated)
- Surgery
  - Routine castration and ovariohysterectomy
  - Removal of uninfected skin mass not involving major reconstruction
- Metabolic
  - Polyuria, polydipsia (unless pyogenic focus suspected)
  - Weight loss
- Skin and ears
  - *Malassezia* dermatitis
  - Acute non-specific pruritus, scaling, nodules, crusts, etc.

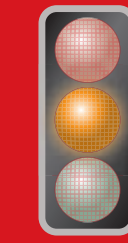
### DO NOT USE

There are very strong arguments that antimicrobials with restricted use in human medicine (e.g. imipenem, linezolid, teicoplanin, vancomycin) should **not** be used in animals under any circumstances.



### Second and Third Choice Antibacterials

These include: amikacin, 3rd generation and 4th generation cephalosporins (except cefovecin) and fluoroquinolones. These antibacterials should be used only when other agents are inappropriate (e.g. in penicillin-sensitive individuals) and/or ineffective, *and* culture/sensitivity testing indicates that they will be effective.



### Follow the Cascade

Suggested antibacterials for dogs and cats are listed in alphabetical order. Order of selection should follow the Prescribing Cascade. The following agents (\*) are not authorized as sole agents for systemic use in small animals: aminoglycosides, azithromycin, erythromycin, gentamicin, metronidazole. Metronidazole is authorized for oral use in combination with spiramycin. Oxytetracycline is not authorized for use in the cat.

