Leaps and Bounds: Veterinary AMS in Australia

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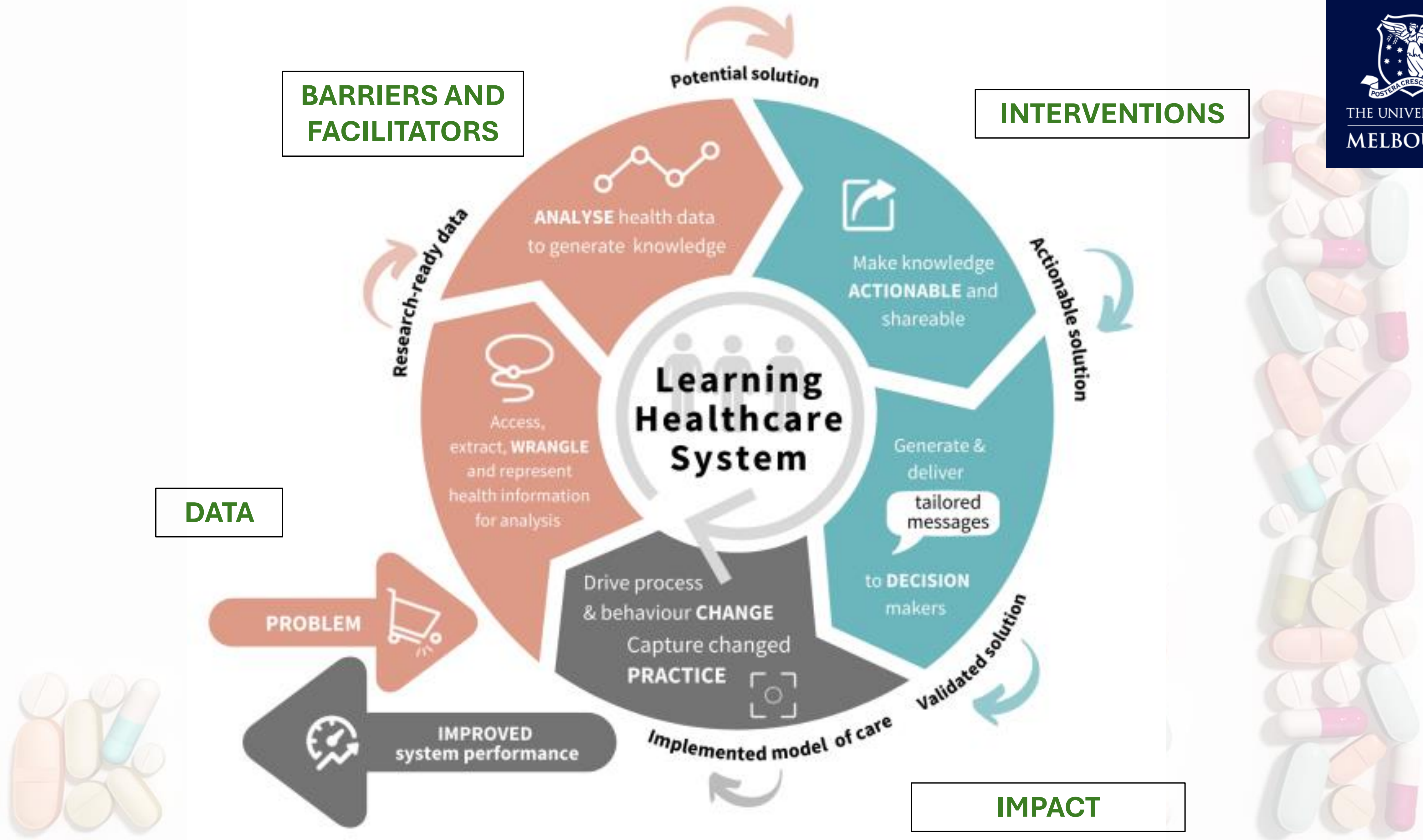
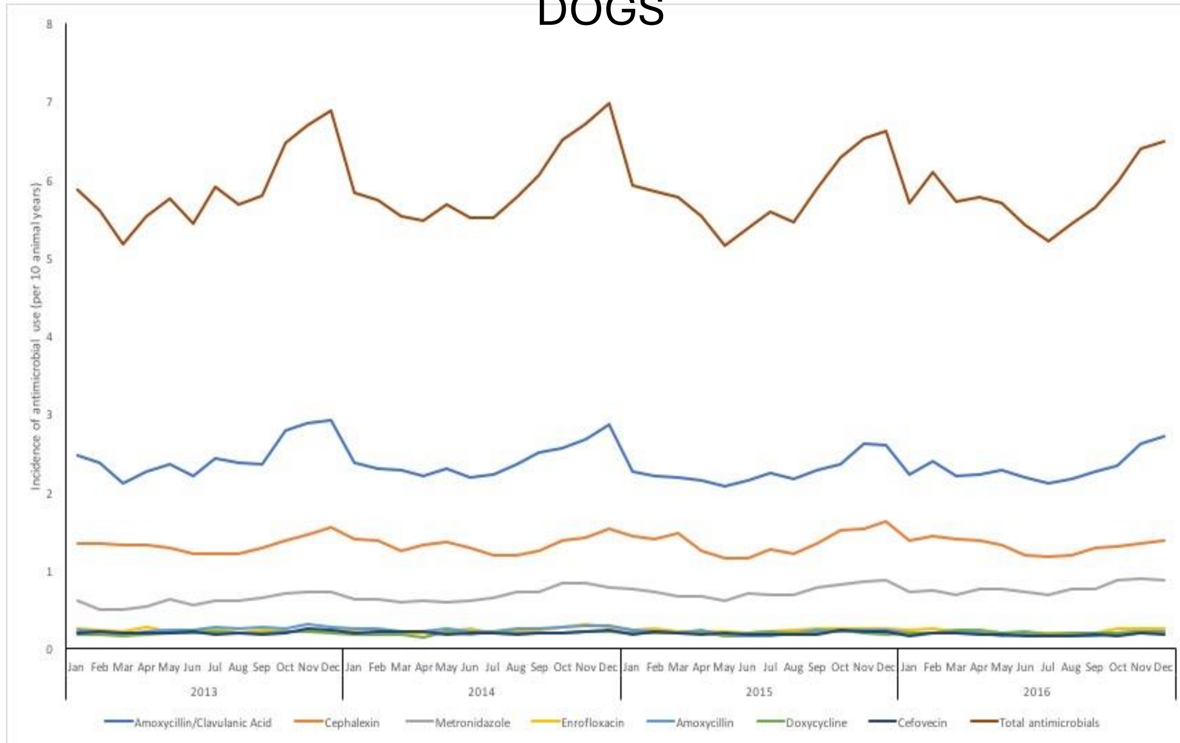
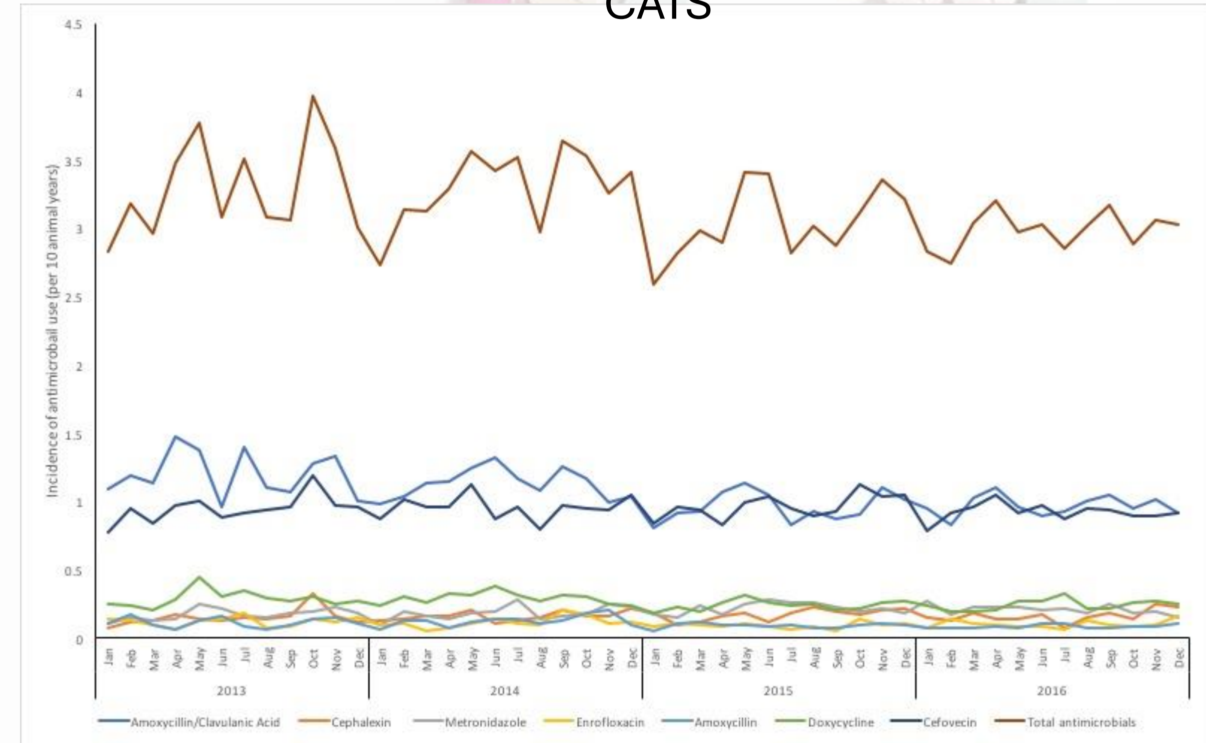
Melbourne Veterinary School


BARRIERS AND FACILITATORS
INTERVENTIONS
DATA
IMPACT
THE UNIVERSITY OF MELBOURNE
POSTERA CRESCAM LAUDE
Potential solution
Research-ready data
Actionable solution
Validated solution
Implemented model of care
ANALYSE health data to generate knowledge
Make knowledge ACTIONABLE and shareable
Access, extract, WRANGLE and represent health information for analysis
Learning Healthcare System
Generate & deliver
tailored messages
to DECISION makers
Drive process & behaviour CHANGE
Capture changed PRACTICE
PROBLEM
IMPROVED system performance

DATA



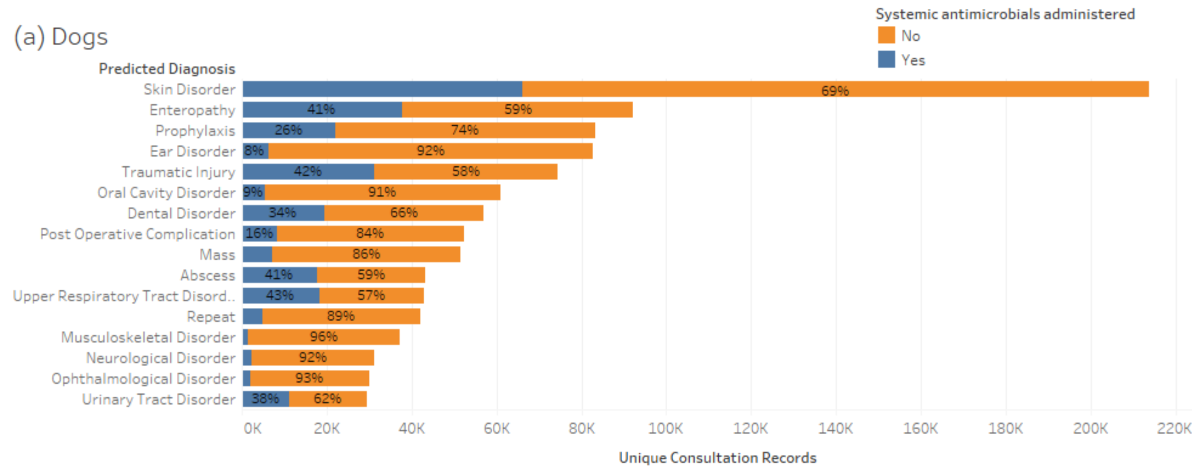
IR 5.8 prescriptions per
10 dog years

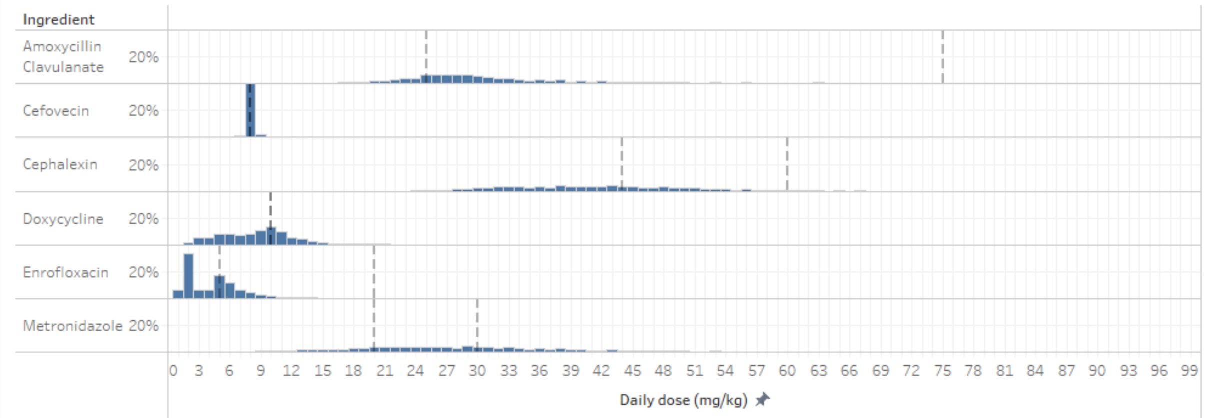


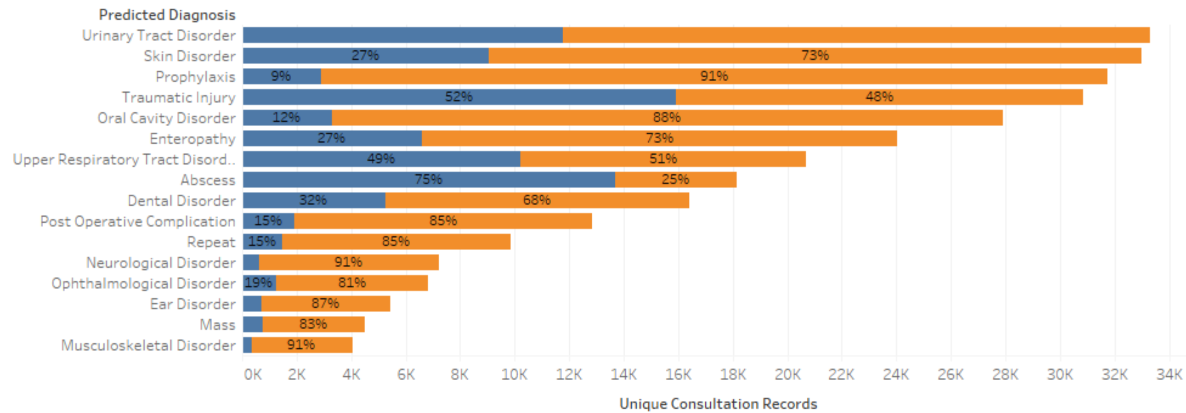
IR 3.1 prescriptions per
10 cat years

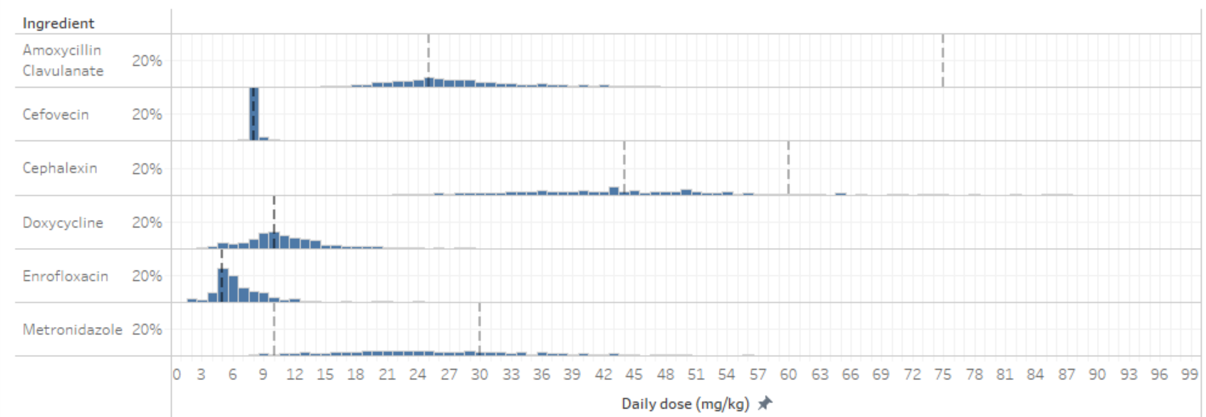
Hardefeldt et al. doi: 10.1016/j.vetmic.2018.09.010

DATA

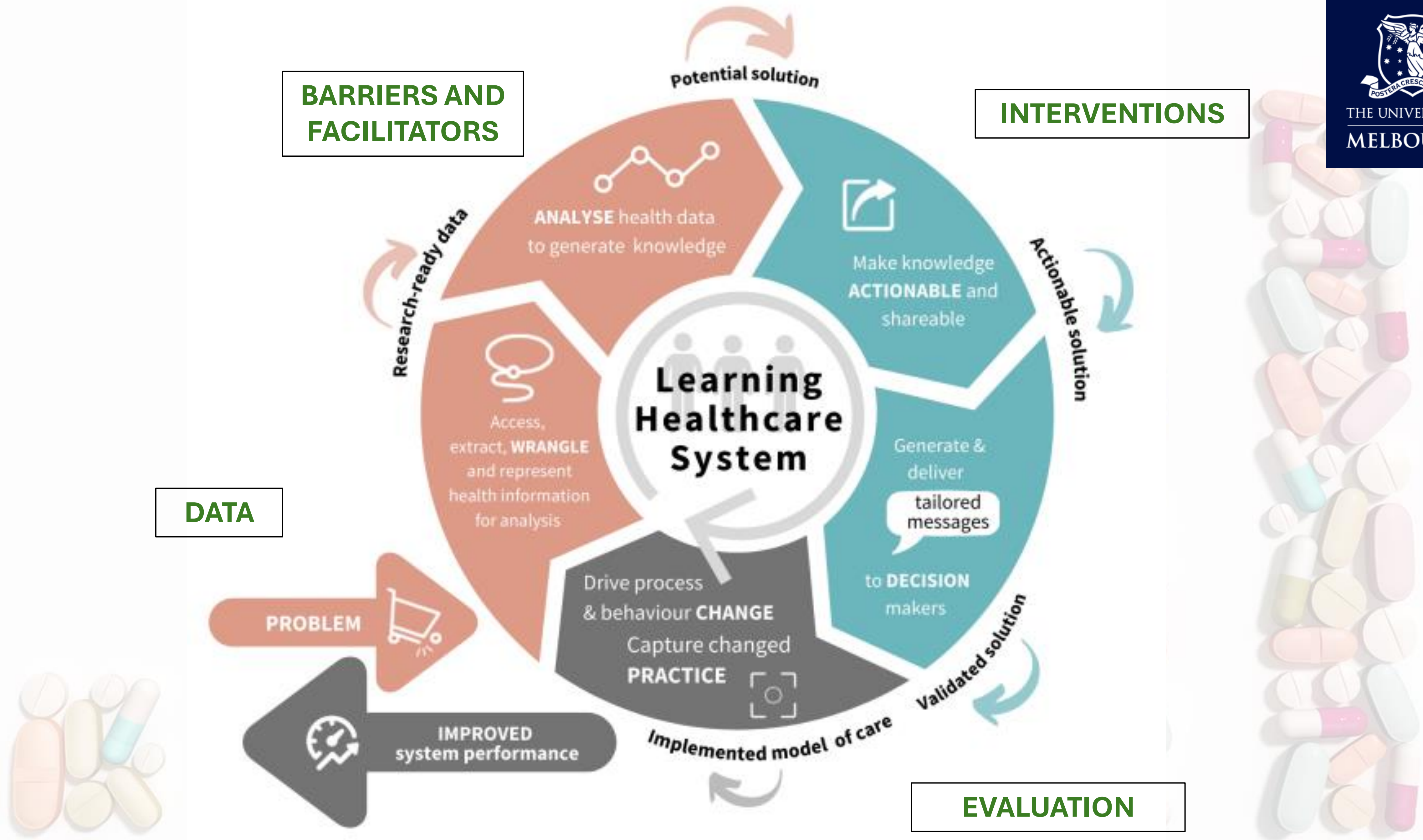








Hur et al. doi: doi.org/10.1093/jacamr/dlab194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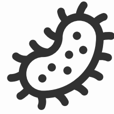
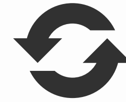
Drivers of antimicrobial use when its not needed

Communication skills and self-confidence



General attitudes to AMR



Habits

Energy levels

Beliefs about the consequences of withholding antimicrobials

Fears of clinical deterioration

Fear of failing to meet client expectations

Scarborough et al. doi: doi.org/10.3390/antibiotics12030540

CLIENT FACTORS

Clients' expectation of antimicrobials and the difficulty of withholding antimicrobials in these situations

Perceived capacity to adequately monitor their animal or to undertake non-antimicrobial management at home such as wound care

Quality of the veterinarian-client relationship

Health literacy

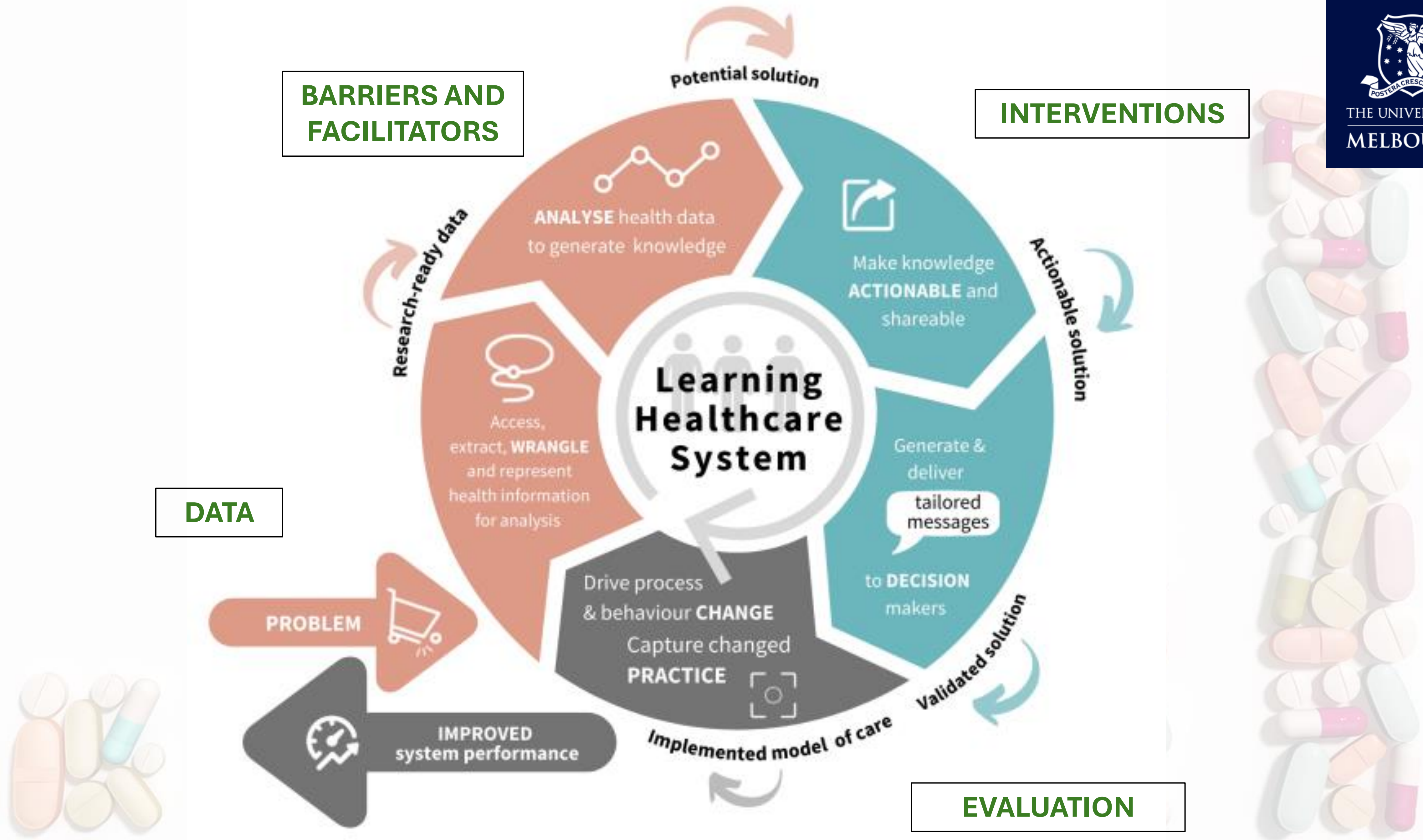
Perceived capacity to pay for further investigations

PRACTICE FACTORS

Availability of other clinic staff to help with investigations

Time pressure

Perceived approval (or disapproval) from clients, employer, colleagues, veterinary board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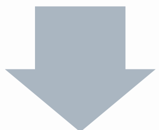
EVALUATION

IMPLEMENTATION

Planning
July 2018



Implementation
October 2018 – July 2019

Post-implementation
August 2019 – October 2020

CON
- Prescribing guideline poster
- Educational webinars

AMS1
- Appoint stewardship champion
- Implement traffic light system
- Diagnostic testing guidelines
- Incorporate AMS in staff induction policy

AMS2
- Local prescribing guidelines
- Antimicrobial resistance surveillance
- Restrict critical antimicrobials
- Audit and feedback
- Delayed prescribing

Hardefeldt et al. doi: doi.org/10.1093/jacamr/dlac015
Richards et al. doi: doi.org/10.1002/vetr.3268

Australian Veterinary Prescribing Guidelines

Clinic Stewardship Champion: ....

For more information and further resources visit
www.fvas.unimelb.edu.au/vetantibiotics

Dogs and Cats

SURGERY

CLEAN SURGERY, NO MITIGATING FACTORS

FIRST LINE: NONE.

MITIGATING FACTORS: Amoxycillin or 1st generation cephalosporin.

MITIGATING FACTORS:
- Hypotension.
- Surgical duration >90 mins.
- Obese dogs.
- Endocrine disorder.
- Bacterial dermatitis.
- Surgery involves implant.

DURATION OF THERAPY: Stop within 24 hours (except dermatitis - treat until cured).

CLEAN CONTAMINATED SURGERY

Enterotomy, cystotomy, etc.

FIRST LINE: Amoxycillin or 1st generation cephalosporin.

DURATION OF THERAPY: Stop within 24 hours.

CONTAMINATED SURGERY

Pyometra, prostatic abscess, significant bowel leakage.

FIRST LINE: Amoxycillin or 1st generation cephalosporin and gentamicin and metronidazole.

DURATION OF THERAPY: No evidence, 24-48 hours is common in human medicine.

DIRTY SURGERY

Use antimicrobial appropriate for infection (ideally based on culture and sensitivity) and treat until cured.

TIMING IV ANTIMICROBIALS

30-60 mins prior to surgery, repeat cefazolin every 4 hours, amoxycillin every 2 hours.

SC antimicrobials 2 hours prior to surgery.

CLINIC POLICY

CLEAN: ....

CLEAN CONTAMINATED: ....

CONTAMINATED: ....

DENTAL SURGERY

ROUTINE DENTALS: NO ANTIMICROBIALS

DENTALS WITH EXTRACTIONS:

Bacteraemia expected for approximately 20 mins.
Prophylactic antimicrobials only in patients that can not tolerate transient bacteraemia (~20 mins). Recommended for:
- Immunosuppressed.
- Geriatrics.
- Patients with severe heart disease.
- Patients with systemic illness.

FIRST LINE: Amoxycillin IV 30 mins (2 hours if IM/SC) prior to surgery, or clindamycin.

DURATION OF THERAPY: One dose only or 2nd dose 6 hours later.

CLINIC POLICY

FIRST LINE: ....

SECOND LINE: ....

ACUTE GASTROENTERITIS

TREATMENT

Antimicrobials only when signs of sepsis or confirmation of specific bacterial enteropathogens.

FIRST LINE: NONE.

SPECIFIC CLOSTRIDIAL ENTEROPATHOGENS: Metronidazole.

SEPSIS: Amoxycillin + gentamicin + metronidazole.

CLINIC POLICY

FIRST LINE: ....

SECOND LINE: ....

UPPER RESPIRATORY DISEASE

FELINE RHINITIS ≤ 10 days

Limited benefit of cytology or culture & susceptibility testing.

SEROUS DISCHARGE: NONE.

MUCOPURULENT OR PURULENT BUT SYSTEMICALLY WELL: NONE.

MUCOPURULENT OR PURULENT BUT SYSTEMICALLY UNWELL: Doxycycline.

DURATION OF THERAPY: 7-10 days.

FELINE RHINITIS > 10 days

Antimicrobials should be selected based on culture and susceptibility testing. No evidence that 3rd generation cephalosporins or fluoroquinolones are more effective than doxycycline or amoxycillin.

DURATION OF THERAPY: Up to 1 week past resolution of clinical signs.

CLINIC POLICY

ACUTE RHINITIS: ....

CHRONIC RHINITIS: ....

CANINE INFECTIOUS RESPIRATORY DISEASE COMPLEX

Interpreting cytology and culture and susceptibility testing difficult.

NO EVIDENCE OF PNEUMONIA & SYSTEMICALLY WELL: NONE.

NO EVIDENCE OF PNEUMONIA & SYSTEMICALLY UNWELL: Doxycycline or amoxycillin.

DURATION OF THERAPY: 7-10 days.

Usually responds quickly, consider further work-up if poor response.

CLINIC POLICY

FIRST LINE: ....

SECOND LINE: ....

OTITIS EXTERNA

DIAGNOSTICS

Cytological evaluation should always be performed to identify pathogens and inflammatory cells.
Culture and susceptibility testing should be performed when:
- Rods are present on cytology.
- Lack of response to antimicrobial therapy.
- Chronic otitis.

Ensure tympanic membrane is intact, ear flushing under GA may be necessary.
Collect specimens before flushing.

If recurrent underlying disease should be investigated (foreign body, atopy, anatomical anomaly).

TREATMENT

Ear flushing (under GA if necessary): warm sterile saline under controlled pressure.

FIRST LINE: Cocci only OR cocci & rods:
- **Intact tympanic membrane: ear flushing, topical therapy with fucidic acid and framycetin combination or gentamicin.**
- **Perforated tympanic membrane: ear flushing and non-ototoxic cleaners, avoid topical antimicrobials.**

DURATION OF THERAPY: 10-14 days.

Rods only:
- **Intact tympanic membrane: ear flushing, topical therapy with polymixin B, gentamicin or marbofloxacin.**
- **Perforated tympanic membrane: ear flushing and non-ototoxic cleaners, avoid topical antimicrobials.**

DURATION OF THERAPY: 10-14 days.

Systemic antimicrobials – often ineffective and usually only indicated when middle or inner ear is involved. Base therapy on culture and susceptibility.
Non-ototoxic agents: chlorhexidine, Tris-EDTA.
Ototoxic agents: polymixin B, aminoglycosides.
Less ototoxic agents: fluoroquinolones (marbofloxacin, ciprofloxacin).

CLINIC POLICY

FIRST LINE: ....

SECOND LINE: ....

PNEUMONIA

DIAGNOSTICS

Tracheal for cytology and culture & susceptibility testing is strongly recommended prior to antimicrobial therapy.

Consider underlying disease process that predisposed to pneumonia. Consult with microbiologist to interpret results (airway contaminants possible).

TREATMENT

FIRST LINE: Mild: Doxycycline.

MILD ASPIRATION: No treatment or amoxycillin or 1st generation cephalosporin.

PNEUMONIA & SEPSIS: Enrofloxacin and amoxycillin pending culture and susceptibility results. Consider metronidazole or clindamycin if anaerobes are suspected.

DURATION OF THERAPY: Review after 10-14 days.

CLINIC POLICY

MILD: ....

MILD ASPIRATION: ....

PNEUMONIA & SEPSIS: ....

PYODERMA

DIAGNOSTICS

Cytological evaluation is needed to identify the existence of a bacterial pyoderma.
Use adhesive tape, direct smear, or FNA (for pustules or nodules).
Culture and susceptibility testing recommended in all cases of bacterial pyoderma in which systemic antimicrobials are being considered.
Also strongly encouraged when:
- Rods are present on cytology.
- Lack of response to antimicrobial therapy.
- New lesions develop during treatment.
- Chronic or recurrent pyoderma.

Consider underlying disease.

TREATMENT

Surface, superficial, and localised deep pyoderma.

FIRST LINE: Topical antiseptic shampoo treatment, allow contact with skin for 5-10 mins.

SYSTEMIC ANTIMICROBIALS: In cases where large areas of body affected or when hair follicles and surrounding skin involved: 1st generation cephalosporins or amoxycillin/clavulanate.

Chlorhexidine shampoo twice weekly and chlorhexidine spray daily is comparable to amoxycillin/clavulanate.

Re-evaluate <3 weeks and before end of treatment course.

CLINIC POLICY

FIRST LINE: ....

SECOND LINE: ....

ACUTE HAEMORRHAGIC DIARRHOEA

3 CATEGORIES

1. Mild bloody diarrhoea, normovolaemic and systemically well.
2. Severe bloody diarrhoea with hypovolaemia but not septic.
3. Severe bloody diarrhoea with hypovolaemia and sepsis.

FIRST LINE:

GROUP 1: No antimicrobials.

GROUP 2: Fluid therapy and monitor for sepsis.

GROUP 3: Fluid therapy and amoxycillin + gentamicin + metronidazole.

CLINIC POLICY

GROUP 1: ....

GROUP 2: ....

GROUP 3: ....

LOWER URINARY TRACT DISEASE

DIAGNOSTICS

Urinalysis and cytological evaluation of stained and unstained urine sediment.

Culture and susceptibility testing recommended in all cases (collect via cystocentesis, refrigerate, culture within 24 hrs).

If complicated, consider underlying disease.

TREATMENT

REMEMBER the majority of cats (particularly young cats) with lower urinary tract signs **do not** have bacterial cystitis.

INTACT MALE DOGS: Cystitis rare, consider bacterial prostatitis.

IDIOPATHIC CYSTITIS OF CATS: No antimicrobial therapy.

SPORADIC (UNCOMPLICATED) CYSTITIS IN DOGS AND CATS: Amoxycillin or trimethoprim/sulphonamide (pending culture and susceptibility testing).

DURATION OF THERAPY: 3-5 days.

Should respond in 48h, further investigation if not responding.
DO NOT change antimicrobials empirically.

If responding to therapy and culture results indicate resistance, don't change antimicrobials.

Urine culture should NOT be performed after resolution of clinical signs.

RECURRENT (COMPLICATED) CYSTITIS IN DOGS AND CATS: Amoxycillin or trimethoprim/sulphonamide (pending culture and susceptibility testing). Consider work-up for co-morbidities.

DURATION OF THERAPY: Goal is for clinical cure NOT microbiological cure. If reinfection, 3-5 days based on susceptibility testing.

If persistent relapsing infections or urinary tract abnormalities 7-14 days. See website for indications for re-culture.

Side effects can occur with long term trimethoprim/sulphonamide.
No evidence to support use of antimicrobials before, during or after removal of an indwelling urinary catheter in dogs or cats. Studies suggest this may promote resistance. Culture urine before starting treatment.

CLINIC POLICY

FIRST LINE: ....

SECOND LINE: ....

CELLULITIS, ABSCESS & TRAUMATIC WOUNDS

DIAGNOSTICS

History, clinical presentation & cytology.

Culture and susceptibility testing recommended when: Lack of response to antimicrobial therapy.

If doesn't respond consider underlying disease.

TREATMENT

FIRST LINE: Draining & flushing alone.

Systemic antimicrobials only when:
- Systemically unwell.
- Diffuse tissue involvement.
- Potential joint involvement.
- Immunosuppressed patient.

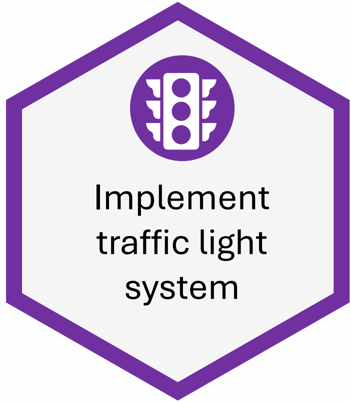
DURATION OF THERAPY: Amoxycillin or ampicillin for 5-10 days.

CLINIC POLICY

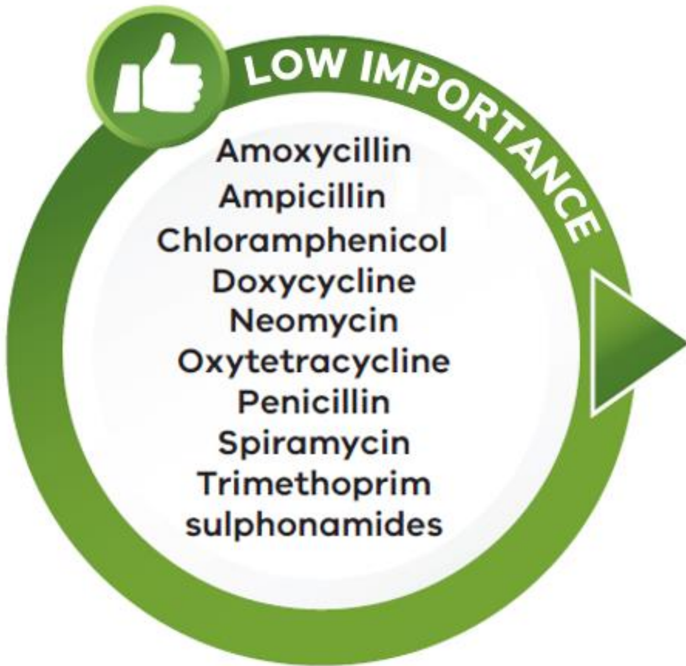
FIRST LINE: ....

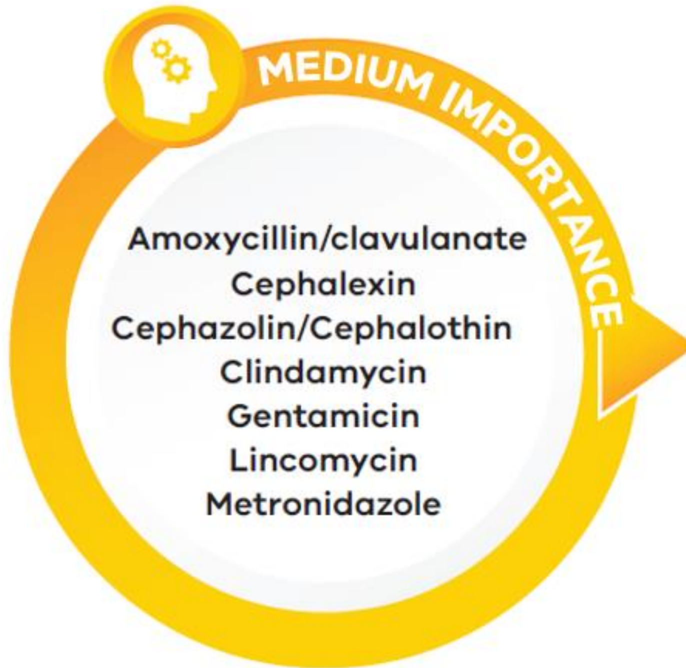
SECOND LINE: ....

NCAS APCAH THE UNIVERSITY OF MELBOURNE AGRICULTURE VICTORIA



Antimicrobials **colour coded** based on antimicrobial importance rating





152 general practice clinics

Excluded:
- Joined the corporate group after the initial program materials were distributed (5)
- Staffed by casual/locum veterinarians (n=10)
- Clinic was closed for a period of time greater than 2 months during the trial (n=2)

135 general practice clinics

Initial allocation

CON 44

AMS1 47

AMS2 44

31 3 10

4 37 6

9 7 28

Reallocation

CON 43

AMS1 46

AMS2 46

Trial was analysed in 3 ways

- A survey completed by ~1/2 of GX vets

- Antibiotic use in the 2 years before the trial compared to the implementation and post-implementation periods

- A series of interviews of vets, nurses, practice managers, RCDs

Decline in overall antimicrobial use

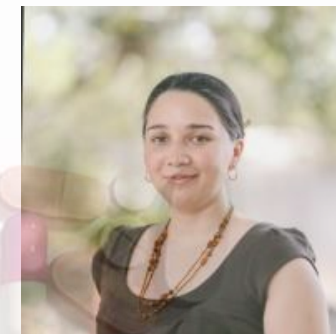
Shift in use towards prescribing of low-importance antimicrobials

Greatest impact seen in high-prescribing clinics

IMPACT

- Change to gentamicin labelling for horses
- Veterinarians seeking out resources

Impact	Impact	Animals receive appropriate antimicrobial therapy, reducing cost to owners and resulting in reduced adverse effects, improved social license for farming and continued low rates of antimicrobial resistance. Change in policy results in antimicrobial surveillance and stewardship become part of Quality Assurance and accreditation programs.
	Change in behaviour & practice	Veterinarians who engage with resources prescribe antimicrobials more appropriately and also influence their colleagues to prescribe better. Change in attitudes leads to increased knowledge and skills.
Research use	Change in knowledge/skills	Increased knowledge about appropriate antimicrobial use in animal, and changes in awareness lead to increased commitment from veterinarians to prescribe more appropriately resulting in better engagement in skills development
	Change in awareness	Veterinarians, farmers and pet owners, and the medical community, increase awareness about veterinary antimicrobial use and resistance. Leads to further engagement with research and resources.
Research uptake	Engagement	Research discussed with policy-makers, veterinarians and other stakeholders. Resources developed for use in veterinary practices. Leads to further engagement with research outputs.
	Outputs	Research made available for discussion and debate through conferences presentations, roadshows, webinars, podcasts, social media and websites. Engagement feeds down to inform research themes.
	Inputs	Partnership with National Centre for Antimicrobial Stewardship, Australian Veterinary Association, Greencross Vets, APIAM investigating antimicrobial use in veterinary practice. Partnerships influence uptake and engagement.



Use of AMS tool	Previous Data	Current 2023 Data
Guidelines	**28%** Hardefeldt et al. 2017 data	**52%** (n=101)
Traffic light cards	**22%** Sri et al. 2020 data	**66%** (n=92)

- **23%** (n=45) aware of at least one of the recently released AVA Prescribing Guidelines
- **66%** had used a 'traffic-light card' to assist in choosing an antimicrobial
- **52%** had used the University of Melbourne Australian Veterinary Prescribing Guidelines

The Australian veterinary prescribing guidelines are evidence-based guidelines that have been created in a collaborative effort between the University of Melbourne's Asia Pacific Centre for Animal Health (APCAH) and the National Centre for Antimicrobial Stewardship.

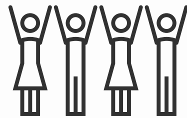
The Guidelines

These guidelines are independent, and we have no conflicts of interest to declare. All peer-reviewed research findings will be considered and critiqued, and guidelines adjusted as we see appropriate for the level of confidence we have in the research completed. Where evidence is lacking, this is stated and our recommendations are then based on human literature and expert opinion.

Screenshot

Conclusions

Australian veterinarians have generally **embraced** the use of **guidelines** to **assist** them in antimicrobial **prescribing decisions**.



Well-positioned to be **leaders** in **antimicrobial stewardship** in a **One Health** context.

Future **prescribing resources** could increase **focus** on **impacts** of **unnecessary prescribing** on animals' health and address **factors leading to over-use** of broad-spectrum antimicrobials, including **client** and **communication** factors.