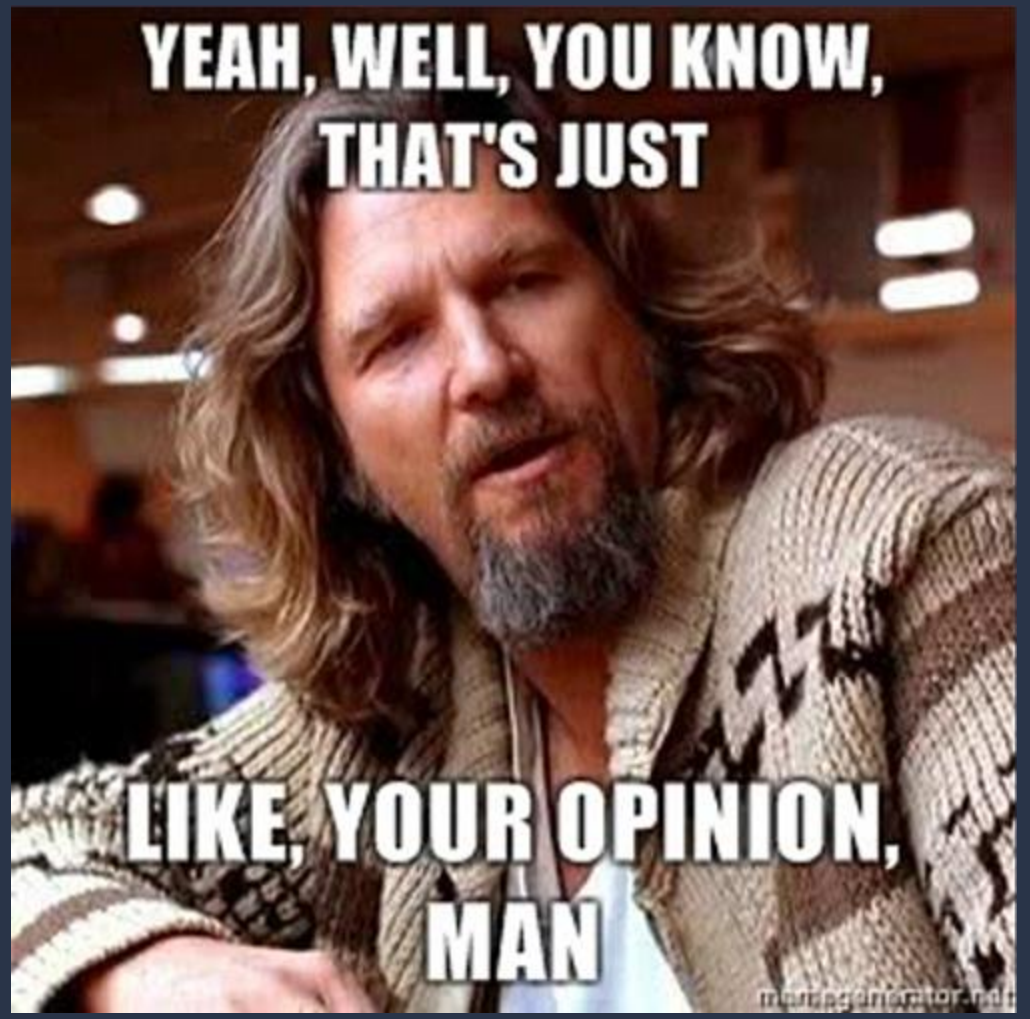
Choosing Wisely

Things to Stop Doing in your Practice (Maybe?)

Brennen McKenzie, MA, MSc, VMD



Key Points

- Context
  - *Why vets are useful*
  - *EBVM vs "It works for me…"*
- Uses of Antibiotics to Reconsider
- Use of Analgesics to Reconsider
- Other Treatments to Reconsider

Why are Vets better than Google?

vs

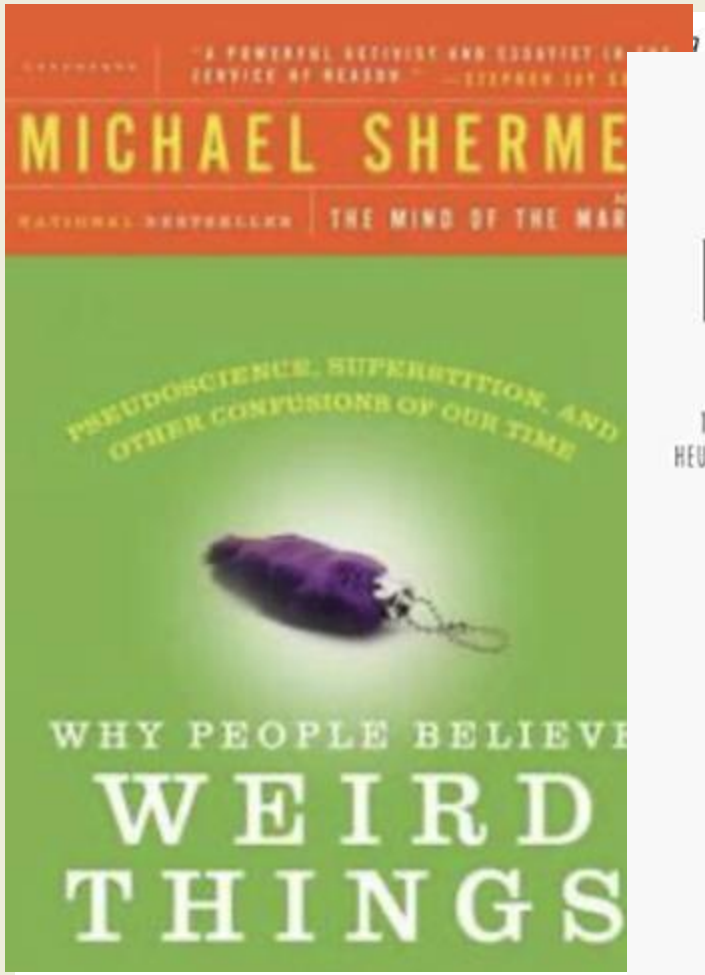
Google

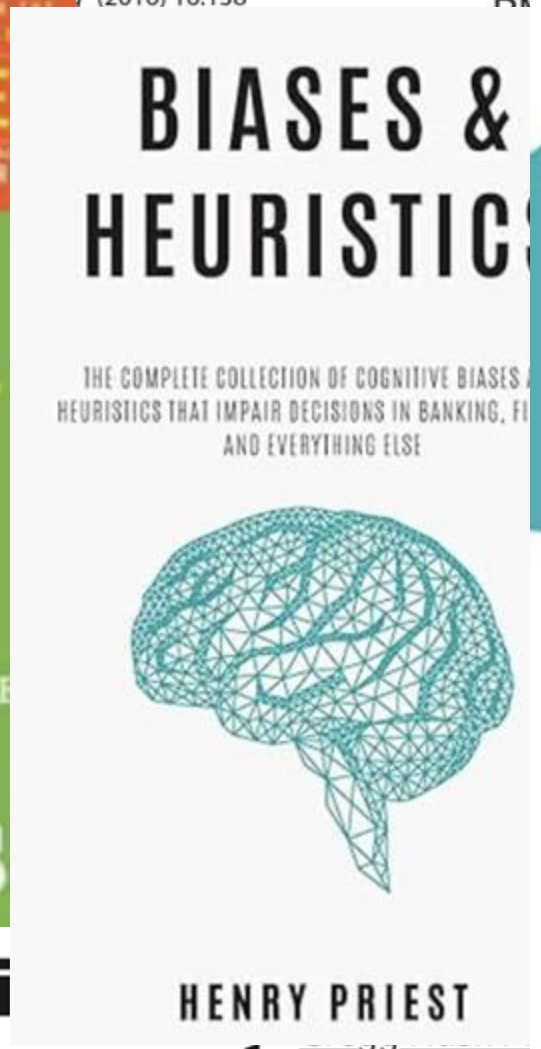
- Information
  - LOTS
  - fast
  - free
  - misinformation

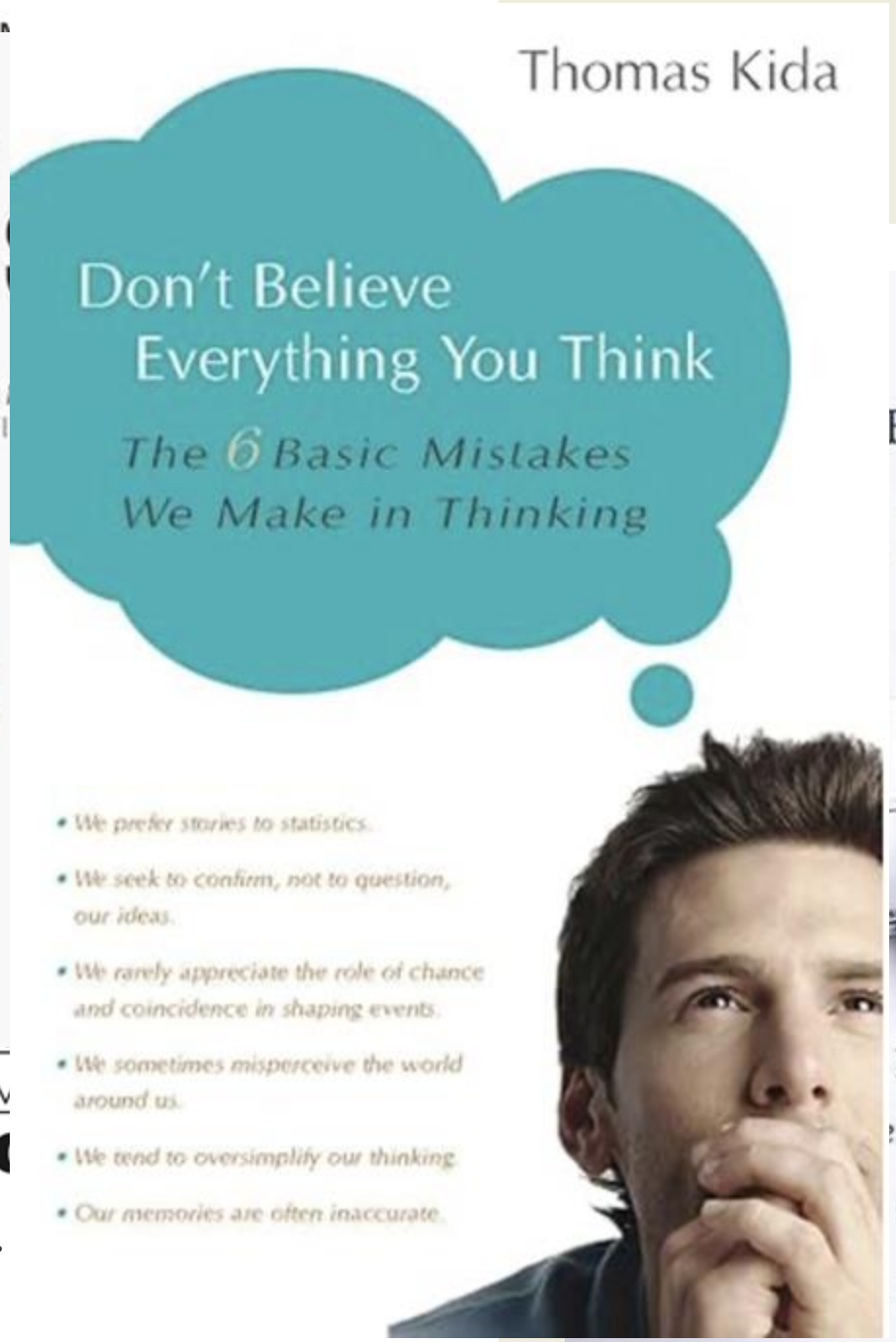
Vets

- Information PLUS
  - context
  - judgement
  - adaptation to individual
  - accurate information

Epistemology
(How do we know what we know)







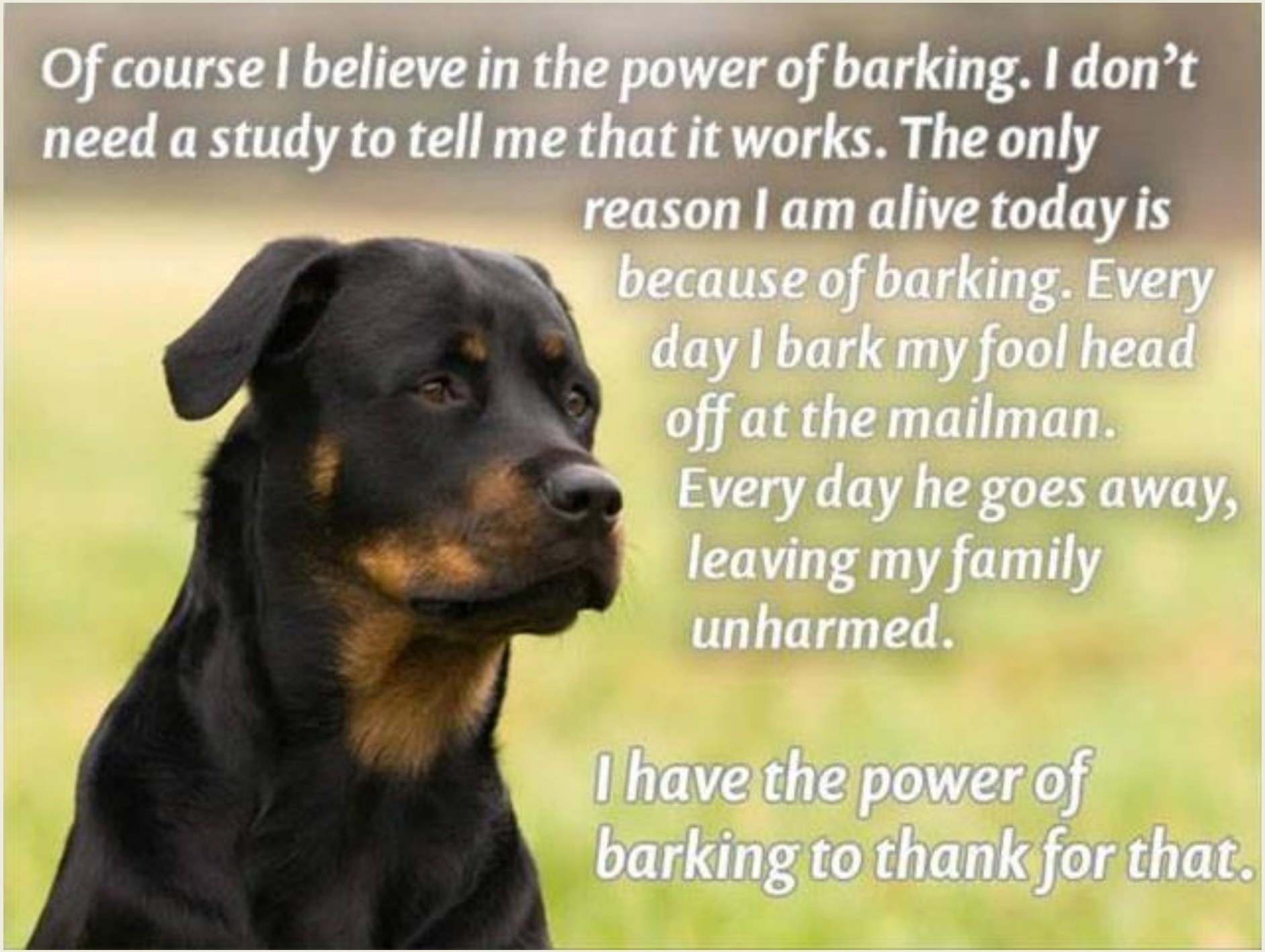
Veterinary cli
cognitive biases, ext
and strategies for impr

Mark Jarrett M

JAVMA. 2014;244(3):271-276.

Brennen A. McKenzie, MA, VMD

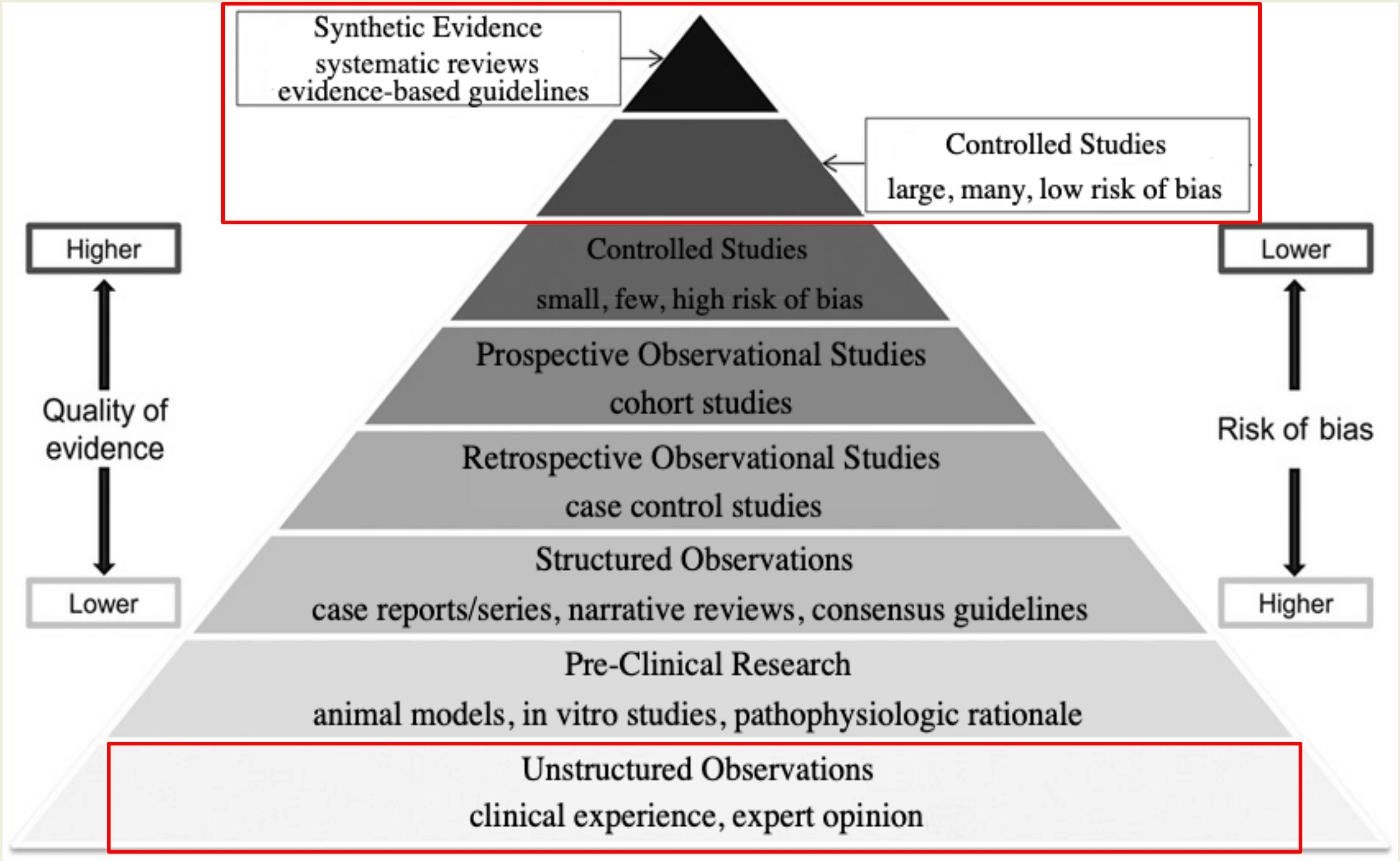
But, it worked for me…..


Of course I believe in the power of barking. I don't need a study to tell me that it works. The only reason I am alive today is because of barking. Every day I bark my fool head off at the mailman. Every day he goes away, leaving my family unharmed.
I have the power of barking to thank for that.

Epistemology
(How do we know what we know?)

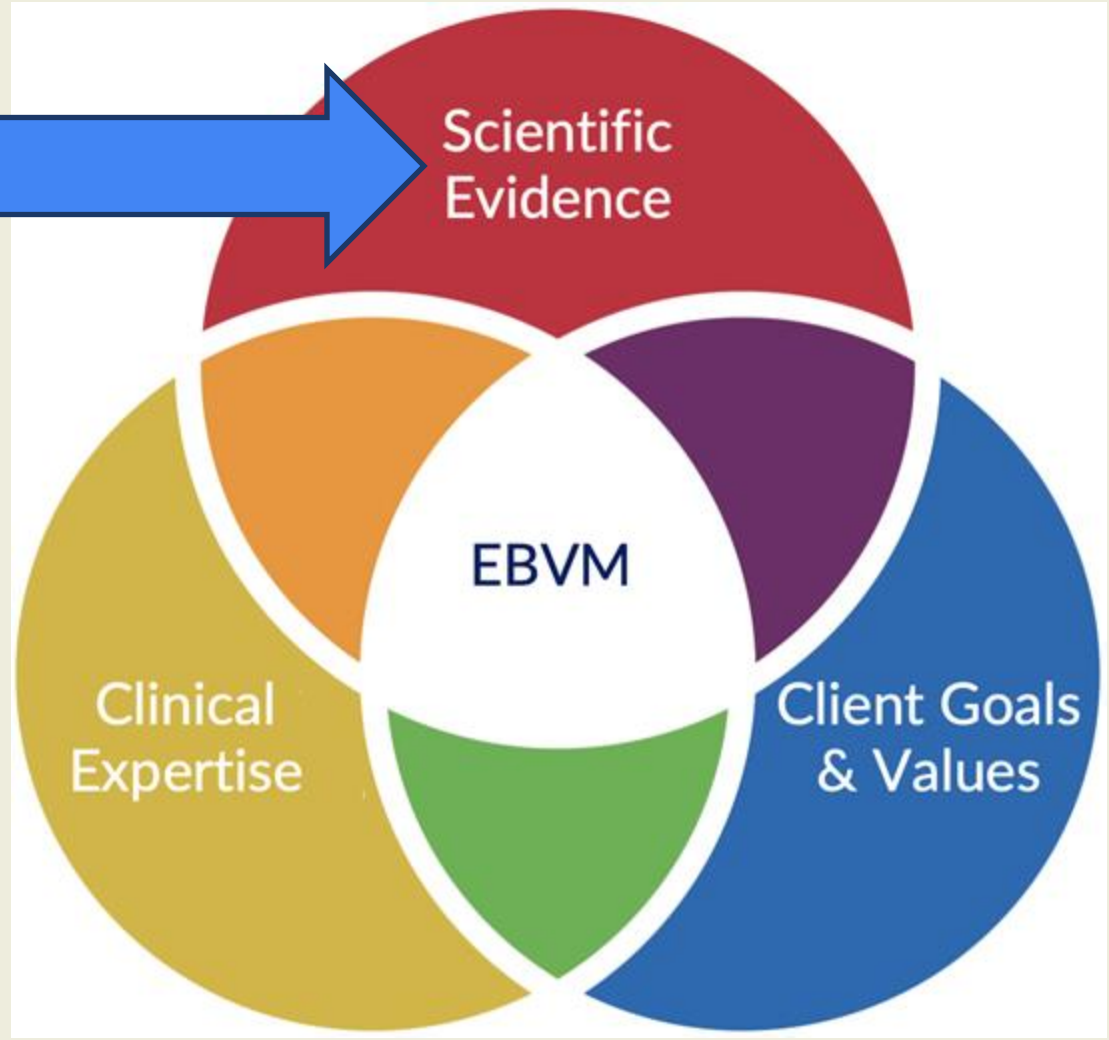
The real purpose of the scientific method is to make sure Nature hasn't misled you into thinking you know something you actually don't know.

Robert Pirsig
Zen and the Art of Motorcycle Maintenance


Synthetic Evidence
systematic reviews
evidence-based guidelines
Controlled Studies
large, many, low risk of bias
Higher
Lower
Controlled Studies
small, few, high risk of bias
Prospective Observational Studies
cohort studies
Retrospective Observational Studies
case control studies
Structured Observations
case reports/series, narrative reviews, consensus guidelines
Pre-Clinical Research
animal models, in vitro studies, pathophysiologic rationale
Unstructured Observations
clinical experience, expert opinion
Quality of evidence
Lower
Higher
Risk of bias

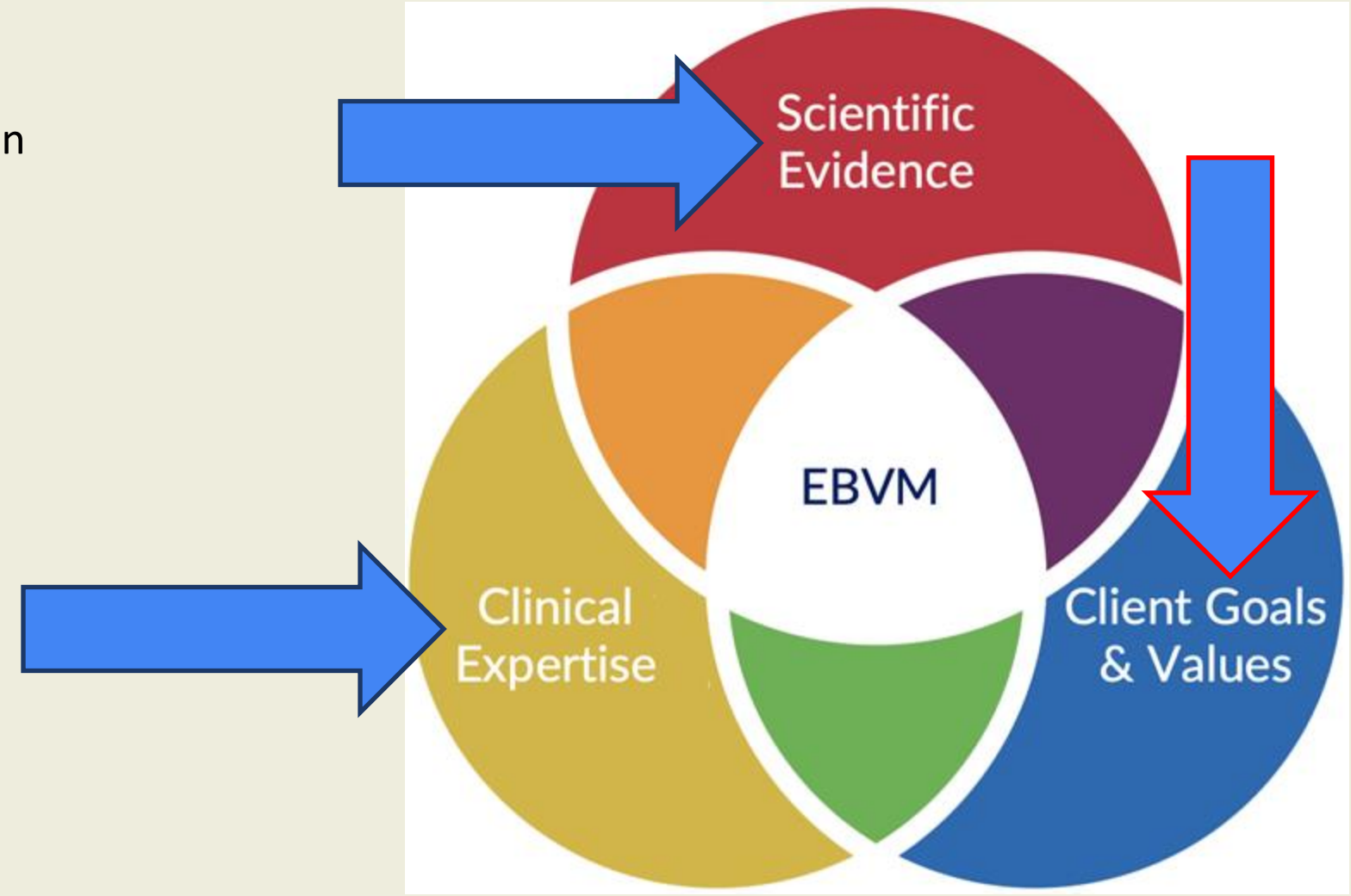
Value Added Information

- Accurate and Useful Information
  - *Accurate, true*



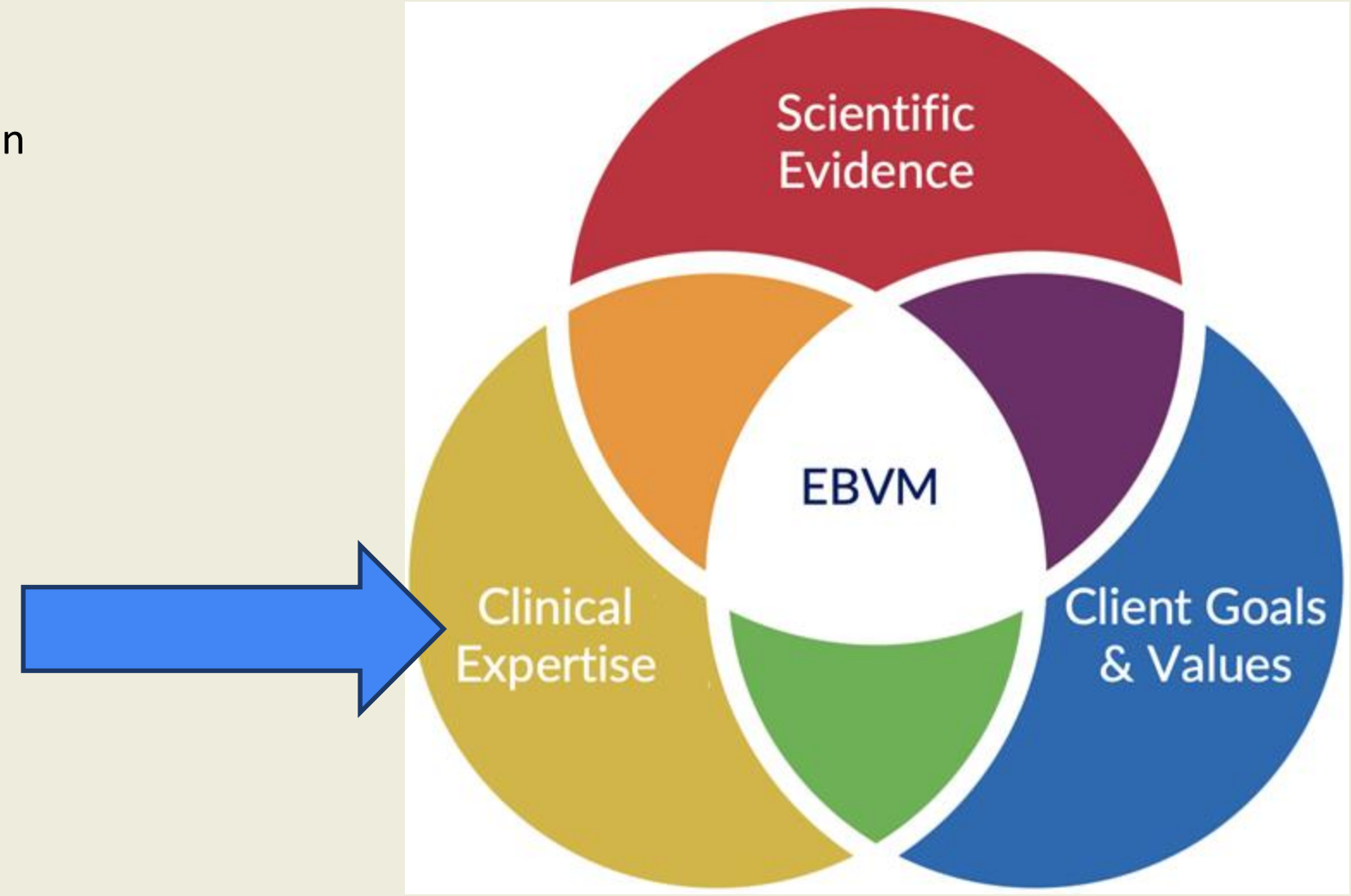
Value Added Information

- Accurate and Useful Information
  - *Accurate, true*
  - *Applicable, relevant*



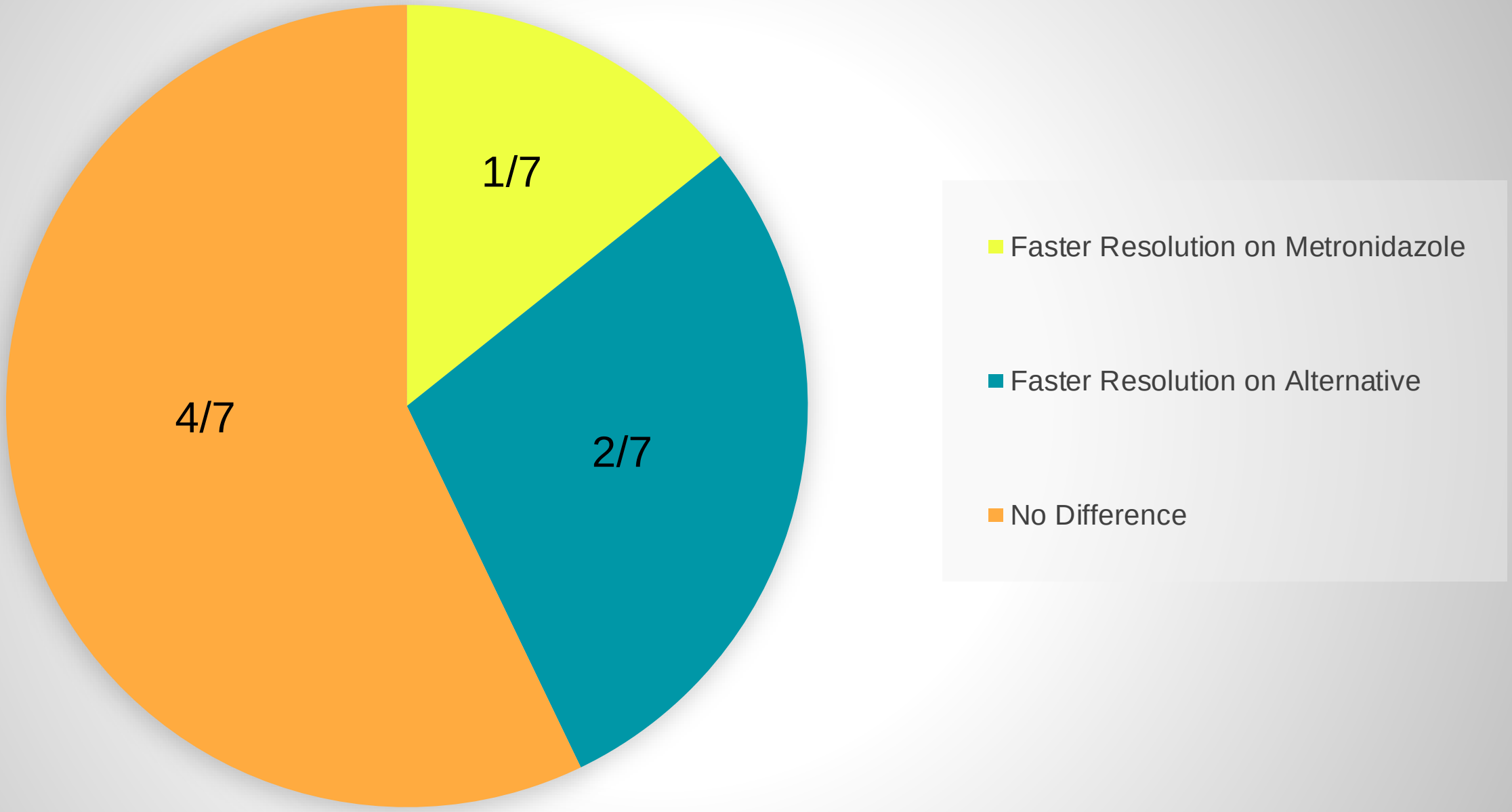
Value Added Information

- Accurate and Useful Information
  - *Accurate, true*
  - *Applicable, relevant*
  - *Effectively applied*



Uses of Antibiotics to Reconsider

Metronidazole
(acute idiopathic diarrhea)

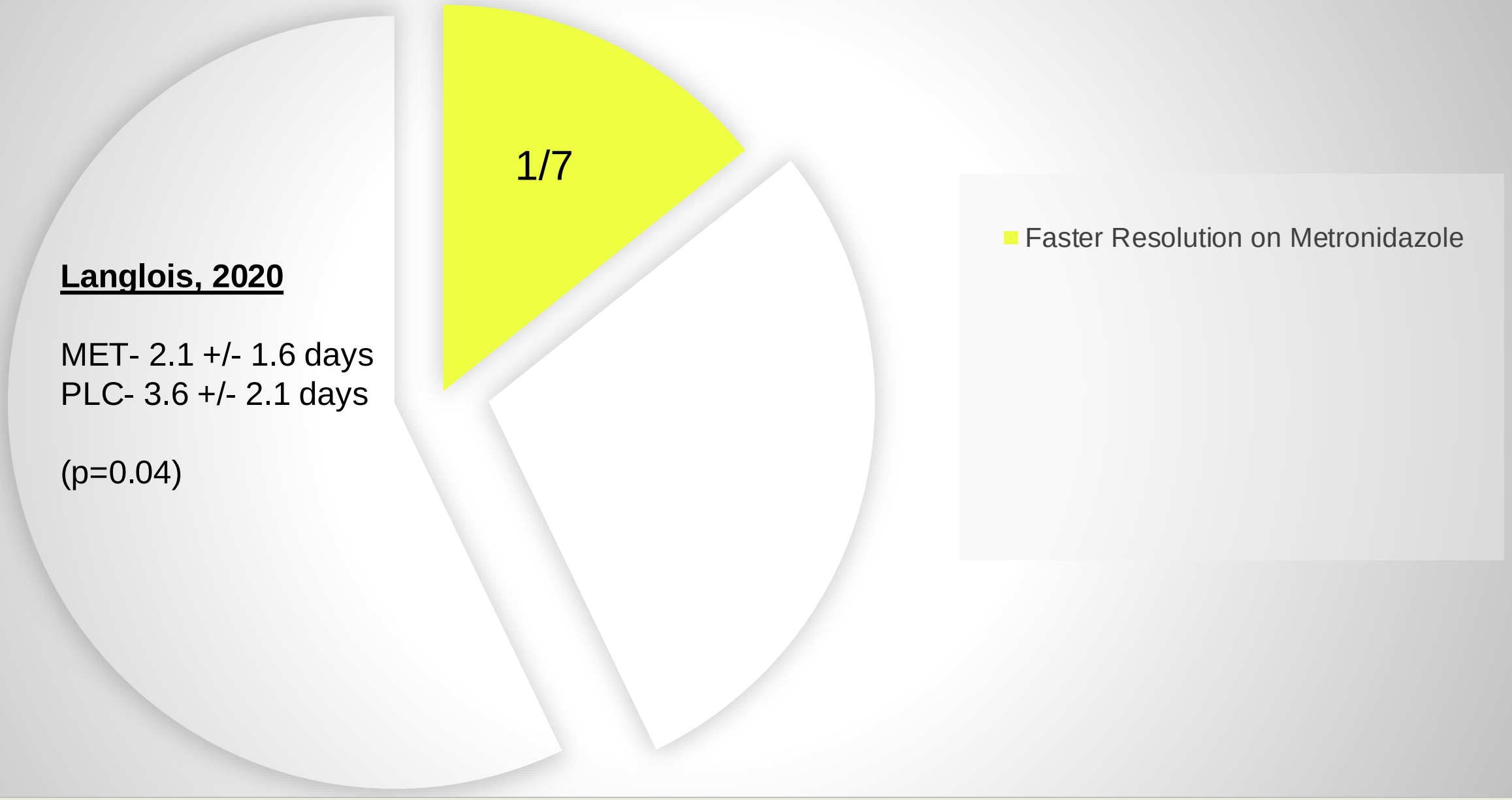


Ellis C, Odunayo A, Tolbert MK. The use of metronidazole in acute diarrhea in dogs: a narrative review. Top Companion Anim Med. 2023 Sep-Dec;56-57:100824

Langlois, 2020

MET- 2.1 +/- 1.6 days
PLC- 3.6 +/- 2.1 days

(p=0.04)



Ellis C, Odunayo A, Tolbert MK. The use of metronidazole in acute diarrhea in dogs: a narrative review. Top Companion Anim Med. 2023 Sep-Dec;56-57:100824

Treatment	Adjusted risk of clinical resolution as if all dogs prescribed (%)	Adjusted risk of clinical resolution as if all dogs not prescribed (%)
Antimicrobials	88.3	87.9

Pegram C, Diaz-Ordaz K, Brodbelt DC, et al. Target trial emulation: Do antimicrobials or gastrointestinal nutraceuticals prescribed at first presentation for acute diarrhoea cause a better clinical outcome in dogs under primary veterinary care in the UK? PLoS One. 2023 Oct 4;18(10):e0291057.

Days after first presentation for acute diarrhoea	Time-to-event probability as if all dogs prescribed antimicrobials (%)	Time-to-event probability as if all dogs not prescribed antimicrobials (%)	Difference in time-to-event probability (%)
1	98.29	97.88	0.41
5	94.86	94.12	0.74
10	93.49	92.93	0.56
15	93.00	92.60	0.40
20	92.75	92.47	0.28
25	92.60	92.40	0.20
30	92.46	92.35	0.11

Pegram C, Diaz-Ordaz K, Brodbelt DC, et al. Target trial emulation: Do antimicrobials or gastrointestinal nutraceuticals prescribed at first presentation for acute diarrhoea cause a better clinical outcome in dogs under primary veterinary care in the UK? PLoS One. 2023 Oct 4;18(10):e0291057.

Metronidazole

- Pros
  - *Gives vets and clients something to do*
  - *Revenue source*
  - *Might have some small benefit in some patients*
  - *Risks are probably small?*
- Cons
  - *Probably doesn't benefit most patients*
  - *If not, then wasted money*
  - *Some direct adverse effects*
  - *Increases risk of Ab resistance*
  - *Encourages anecdote-based decisions*

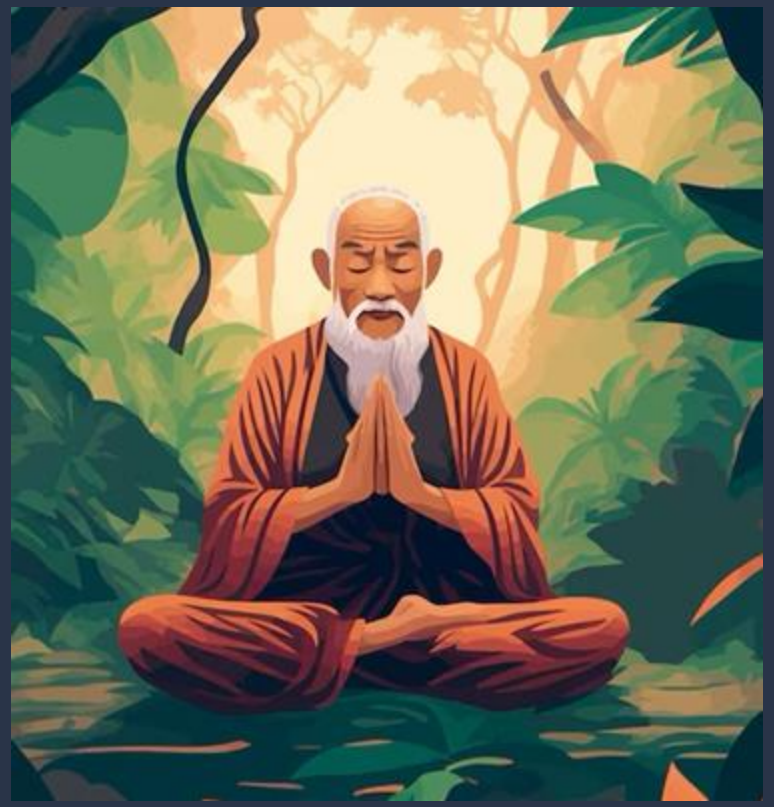
Metronidazole

Who uses that old drug anymore?

vs

It works!
You can take it when you pry it from my cold, dead fingers!

Metronidazole



“I also want to live in a world where antibiotics still work in 50 years...even if the owner has to deal with some bloody poop for an extra day.”

Metronidazole

- Alternatives
  - *Explain it will probably get better on its own*
  - *“bland diet”*
  - *Some evidence to support fiber (prebiotic, motility modifier)*
  - *Probiotics (not great evidence either)*
  - *Deferred prescribing*
  - *Other antibiotics (same issues)*
  - *Other products (lacking evidence)*

Uses of Antibiotics to Reconsider

Upper Respiratory Infections

Upper Respiratory Infections

- Feline URI
  - *Majority have viral cause (FHV-1, FCV)*
    - *Can have secondary bacterial infection*
    - *Cytology and culture not very helpful*
    - *PCR difficult to interpret*

False Cause Fallacy

Viral URI

Antibiotics
Lysine
Homeopathy
Treatment X…

- Patient took X for Disease Y
- Patient got better
- X treats Disease Y

Upper Respiratory Infections

- Feline URI
  - *Recommendations*
    - *Wait 10 days if not very sick*
    - *Use AB only if fever, lethargy, hyporexia*
      - *Doxycycline for 7-10d*
      - *Amoxicillin for 7-10 days*

Lappin MR, Blondeau J, Boothe D, et al. Antimicrobial use Guidelines for Treatment of Respiratory Tract Disease in Dogs and Cats: Antimicrobial Guidelines Working Group of the International Society for Companion Animal Infectious Diseases. J Vet Intern Med. 2017 Mar;31(2):279-294

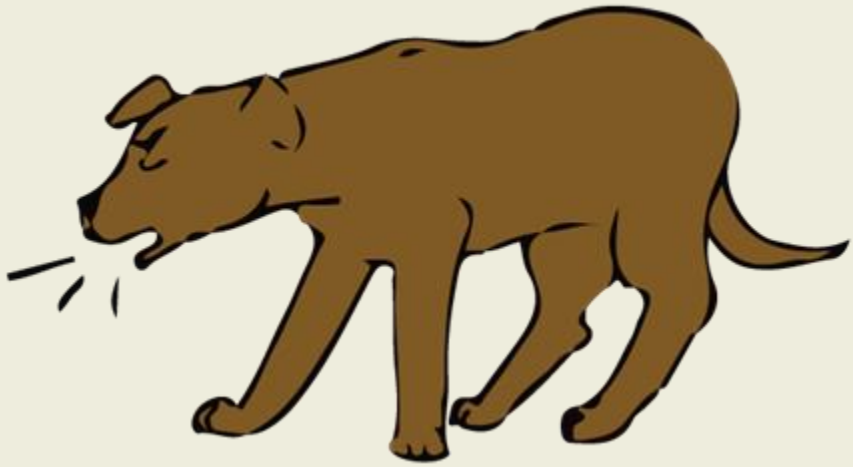
Upper Respiratory Infections

- Feline URI
  - *Recommendations*
    - *Chronic infections*
      - *Full workup*
      - *Culture to choose AB*
      - *Tx 7d or 1 week past resolution*

Lappin MR, Blondeau J, Boothe D, et al. Antimicrobial use Guidelines for Treatment of Respiratory Tract Disease in Dogs and Cats: Antimicrobial Guidelines Working Group of the International Society for Companion Animal Infectious Diseases. J Vet Intern Med. 2017 Mar;31(2):279-294

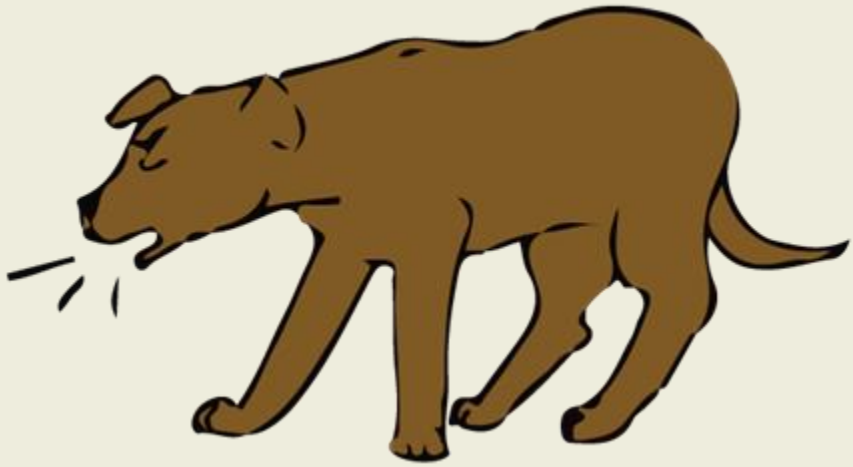
Upper Respiratory Infections

- Canine Infectious Respiratory Disease Complex (CIRD; aka “kennel cough”)
  - *Many viruses*
  - *A few bacteria*
  - *Both often present whether sick or not*
  - *Culture and PCR difficult to interpret*



Upper Respiratory Infections

- CIRD; aka “kennel cough”
  - *Recommendations*
    - *Most don’t need AB*
    - *Wait 10 days if not very sick*
    - *Use AB only if fever, lethargy, hyporexia*
      - *Doxycycline*



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Bonus Treatment to Reconsider

Lysine for Feline Herpesvirus

Bonus Treatment to Reconsider

- Lysine for Feline Herpesvirus
  - *In vitro studies 1960s suggested effects on herpesviruses*
  - *Clinical trials and guidelines in humans in 1970s-1980s suggested benefits*
  - *In vitro studies in 1990s suggested benefit for FHV-1*

Collins BK. Nasisse MP. Moore CP. In vitro efficacy of L-lysine against feline herpesvirus type-1. Proc 26th Ann Meeting Amer Col Vet Opthalmologists. Newport, RI. 1995;141.

Griffith RS, Norins AL, Kagan C. A multicentered study of lysine therapy in Herpes simplex infection. Dermatologica. 1978;156(5):257–67.

Griffith RS. Walsh DE. Myrmen KH. Et al. Success of L-lysine therapy in frequently recurrent herpes simplex infection. Treatment and prophylaxis. Dermatologica.1987;175(4):183-90.

Tankersley Jr RW. Amino acid requirements of herpes simplex virus in human cells. J Bacteriol. 1964;87:609–13.

Bonus Treatment to Reconsider

- Lysine for Feline Herpesvirus
  - *Additional research in humans mixed, no longer recommended in most guidelines*
  - *Additional research in cats not encouraging*

- *There is considerable variability*
- *Data from these studies suggest that lysine is safe*

Collins BK. Nasisse MP. Moore CP. In vitro efficacy of L-lysine against feline herpesvirus type-1. Proc 26th Ann Meeting Amer Col Vet Opthalmologists. Newport, RI. 1995;141.

Griffith RS, Norins AL, Kagan C. A multicentered study of lysine therapy in Herpes simplex infection. Dermatologica. 1978;156(5):257–67.

Griffith RS. Walsh DE. Myrmen KH. Et al. Success of L-lysine therapy in frequently recurrent herpes simplex infection. Treatment and prophylaxis. Dermatologica.1987;175(4):183-90.

Tankersley Jr RW. Amino acid requirements of herpes simplex virus in human cells. J Bacteriol. 1964;87:609–13.

Bonus Treatment to Reconsider

- Lysine for Feline Herpesvirus
  - *Additional research in humans mixed, no longer recommended in most guidelines*
  - *Additional research in cats not encouraging*

- *Administered as a bolus, may reduce viral shedding in latently infected cats*
- *Stress of bolus administration in shelter situations may well negate its effects*
- *Data do not support dietary supplementation*

Thomasy SM, Maggs DJ. A review of antiviral drugs and other compounds with activity against feline herpesvirus-1. Vet Opthalmology. 2016;19(Suppl 1):119-130.

Bonus Treatment to Reconsider

- Lysine for Feline Herpesvirus
  - *Additional research in humans mixed, no longer recommended in most guidelines*
  - *Additional research in cats not encouraging*

- *Does not have an inhibitory effect on FHV-1 replication in the cat.*
- *The claim that lysine supplementation is effective for the prevention or treatment of herpetic lesions in humans cannot be supported by scientific evidence.*
- *Lysine supplementation is not effective to prevent cats from becoming infected with FHV-1*

Bol S. Bunnik EM. Lysine supplementation is not effective for the prevention or treatment of feline herpesvirus 1 infection in cats: a systematic review. BMC Vet Res. 2015:11:284.

Bonus Treatment to Reconsider

- Lysine for Feline Herpesvirus
  - *Additional research in humans mixed, no longer recommended in most guidelines*
  - *Additional research in cats not encouraging*

- *Does not decrease the chance of developing clinical signs related to active FHV-1 infection*
- *Does not have a positive effect on the clinical course of its disease manifestations.*
- *Based on the complete lack of scientific evidence for the efficacy of lysine supplementation, we recommend an immediate stop of lysine supplementation for cats.*

Bol S. Bunnik EM. Lysine supplementation is not effective for the prevention or treatment of feline herpesvirus 1 infection in cats: a systematic review. BMC Vet Res. 2015:11:284.

Uses of Antibiotics to Reconsider

Urinary Tract Infections

Urinary Tract Infections

- Is it a UTI?!
  - *Subclinical bacteriuria (or asymptomatic bacteriuria)*
    - *Bacteria confirmed by culture*
      - *cytology (bacteria, wbc, rbc) not very reliable*
    - *No clinical symptoms of cystitis*
      - *Stranguria, pollakiuria, gross hematuria*
    - *BUT, shouldn't culture without symptoms!!*
    - *1-13% of healthy dogs and cats*
    - *More common with DM, immunosuppression, etc.*

Weese JS, Blondeau J, Boothe D, et al. International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. Vet J. 2019 May;247:8-25.

INTERNAL MEDICINE | NOVEMBER 01 2002

Detection of Occult Urinary Tract Infections in Dogs With Diabetes Mellitus

Nancy C. McGuire, DVM, Diplomate ACVIM; Rhonda Schulman, DVM, Diplomate ACVIM; Marcella D. Ridgway, VMD, MS, Diplomate ACVIM; German Bollero, PhD

J Am Anim Hosp Assoc (2002) 38 (6): 541–544.

Dogs with diabetes mellitus may develop occult urinary tract infections. In this study, diabetic dogs with negative and positive bacterial urine cultures were compared. Records from 51 dogs with diabetes mellitus were reviewed at the University of Illinois. No difference was identified between the groups in urine specific gravity, pH, glucose, ketones, protein, red blood cells, white blood cells, or epithelial cells. Dogs with occult urinary tract infection did have an increased incidence of bacteriuria, but this was not a consistent finding. Therefore, the urine on all diabetic dogs should be cultured to accurately identify the presence or absence of bacterial urinary tract infections.

ACVIM American College of Veterinary Internal Medicine

JOURNAL OF VETERINARY INTERNAL MEDICINE Open Access

STANDARD ARTICLE | Open Access

Prevalence of signs of lower urinary tract disease and positive urine culture in dogs with diabetes mellitus: A retrospective study

Valerie Nelson, Amy Downey, Stacie Summers, Sarah Shropshire

First published: 28 January 2023 | https://doi.org/10.1111/jvim.16634

Conclusion and Clinical Importance

Subclinical bacteriuria occurred in this cohort of dogs, and our findings reinforce the recommendation that urine cultures should not be routinely performed in diabetic dogs

Urinary Tract Infections

- Is it a UTI?!
  - *Subclinical bacteriuria (or asymptomatic bacteriuria)*
    - *Don't treat*
      - *Won't cure, bacteria will recur*
      - *Doesn't benefit patient*
      - *Doesn't lower risk of clinically significant infection*
      - *Increases risk of resistance*
      - *Don't retest (will still be there)*

Weese JS, Blondeau J, Boothe D, et al. International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. Vet J. 2019 May;247:8-25.

Urinary Tract Infections

- Is it a UTI?!
  - *Feline Interstitial Cystitis*
    - *< 10 years old: 2-20% UTI*
    - *> 10 years old: 40-45% UTI*
    - ***Don't Do It!!!!!!***
    - *Adverse effects*
    - *Ab resistance*
    - *Encourages false beliefs*

He C, Fan K, Hao Z, et al. Prevalence, Risk Factors, Pathophysiology, Potential Biomarkers and Management of Feline Idiopathic Cystitis: An Update Review. *Front Vet Sci*. 2022;9:900847.

Dorsch R, Teichmann-Knorrn S, Sjetne Lund H. Urinary tract infection and subclinical bacteriuria in cats: A clinical update. *J Feline Med Surg*. 2019;21(11):1023-1038

- Is it a UTI?!
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    - ***Don't Do It!!!!!!***
    - *Adverse effects*
    - *Ab resistance*
    - *Encourages false beliefs*

Urinary Tract Infections

- Sporadic cystitis
  - *Bacteriuria (ideally confirmed by culture, esp cats!)*
  - *Symptoms of cystitis*
  - *< 3 episodes in 12 months*

Weese JS, Blondeau J, Boothe D, et al. International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. Vet J. 2019 May;247:8-25.

Urinary Tract Infections

- Sporadic cystitis
  - *May not need to treat with AB*
  - *Humans often treated symptomatically (NSAIDs)*
  - *Deferred prescribing*
  - *Choosing AB*
    - *Culture*
    - *Local antibiogram*
    - *Amoxi, clavamox*

Weese JS, Blondeau J, Boothe D, et al. International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. Vet J. 2019 May;247:8-25.

Urinary Tract Infections

- Sporadic cystitis
  - *Tx for 3-5 days*
  - *No evidence for adjunctive Tx (e.g. cranberry)*
  - *Don’t recheck UC if signs resolve*
  - *If signs don’t resolve*
    - *Further workup*
    - *DON’T just change AB!!*

Weese JS, Blondeau J, Boothe D, et al. International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. Vet J. 2019 May;247:8-25.

Urinary Tract Infections

- Recurrent cystitis
  - *>/= 3 episodes in 12 months*
  - *>/= 2 episodes in 6 months*
  - *Try to figure out why*

Table 1. Comorbidities that should be considered in a dog or cat with bacterial cystitis.

Endocrinopathy
Kidney disease
Obesity
Abnormal vulvar conformation
Congenital abnormalities of the urogenital tract (e.g. ectopic ureter, mesonephric duct abnormalities)
Prostatic disease
Bladder tumor
Polypoid cystitis
Urolithiasis
Immunosuppressive therapy
Rectal fistula
Urinary incontinence/retention

Weese JS, Blondeau J, Boothe D, et al. International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. Vet J. 2019 May;247:8-25.

Urinary Tract Infections

- Recurrent cystitis
  - *>/= 3 episodes in 12 months*
  - *>/= 2 episodes in 6 months*
  - *Try to figure out why*
  - *Episodes can still be Tx x 3-5d*
    - *Likely won't cure so control symptoms*
  - *Repeat + culture during Tx means more workup, not just different AB*
  - *Ongoing AB Tx not recommended*
  - *Other stuff??*

Weese JS, Blondeau J, Boothe D, et al. International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats. Vet J. 2019 May;247:8-25.

Uses of Antibiotics to Reconsider

Perioperative

Perioperative Antibiotics

- General Principles
  - *Often not needed*
  - *Case selection is critical*
  - *Give before and during, rarely after*

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Perioperative Antibiotics

- Case Selection
  - *Wound type*

Wound type	Description	Examples	Infection risk
Clean	➢ Elective, non-emergency, non-traumatic ➢ No acute inflammation ➢ No break in aseptic technique ➢ Respiratory, gastrointestinal, biliary and genitourinary tracts not entered (excluding routine sterilisation operations) ➢ Primary closure (± active drainage)	➢ Explorative laparotomy ➢ Castration ➢ Ovariectomy/ ovariohysterectomy ➢ Orthopaedic operations ➢ Salivary mucocoele	2.0-4.8%

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Perioperative Antibiotics

- Case Selection
  - *Wound type*

Wound type	Description	Examples	Infection risk
Clean-contaminated	➢ Elective entry into respiratory, gastrointestinal, biliary or genitourinary tracts with minimal spillage and without evidence of infected urine, bile or secretions ➢ Minor break in technique ➢ Emergency operations that are otherwise clean	➢ Enterotomy ➢ Intestinal anastomosis ➢ Cystotomy ➢ Cholecystectomy ➢ Pyometra ➢ Emergency operations are by definition *at least* clean-contaminated	3.5-5.0%

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Perioperative Antibiotics

- Case Selection
  - *Wound type*

Wound type	Description	Examples	Infection risk
Contaminated	➢ Surgery of respiratory, gastrointestinal, biliary or genitourinary tracts with gross spillage or evidence of infected urine, bile or secretions ➢ Major break in aseptic technique ➢ Acute, non-purulent inflammation ➢ Traumatic wounds <4 hours old ➢ Chronic open wounds for grafting or covering	➢ Enterotomy ➢ Intestinal anastomosis ➢ Cystotomy ➢ Cholecystectomy ➢ Pyometra with leakage	4.6-12%

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Perioperative Antibiotics

- Case Selection
  - *Wound type*

Wound type	Description	Examples	Infection risk
Dirty	➢ Pre-existing perforation of respiratory, gastrointestinal, biliary or genitourinary tracts with minimal spillage and without evidence of infected urine, bile or secretions ➢ Purulent infections ➢ Traumatic wounds >4 hours old ➢ Wounds with necrosis, foreign material or faecal contamination	➢ Leakage from perforated viscera ➢ Infected operation sites ➢ Septic peritonitis ➢ Abscesses ➢ Open fractures	6.7-18%

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Perioperative Antibiotics

- Case Selection
  - *Patient risk*

ASA classification	Description	Examples
1	Healthy individuals without known disease.	Castration, sterilisation, uncomplicated hernia closure, patellar luxation, cruciate ligament rupture.
2	Localised disease or mild systemic illness (afebrile patients which are clinically unaffected).	Deformities, uncomplicated diabetes mellitus, skin tumours, trauma without hypovolaemia, mild infections without fever.
3	Serious systemic illness (febrile patients with clinical signs of disease).	Fever, anaemia, complicated diabetes mellitus, diabetic ketoacidosis, cardiac murmurs, moderate trauma, pneumonia.
4	Serious, life-threatening illness.	Severe trauma with hypovolaemia, cardiac failure, renal failure, hepatic failure.
5	Moribund, not expected to survive >24 hours without surgical intervention.	Polytrauma, multi-organ failure, terminal neoplasia, Addisonian crisis, gastric dilation-volvulus.

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Perioperative Antibiotics

- Case Selection
  - *Wound type*
  - *Patient risk*

- ASA 1-3 + Clean or Clean Contaminated
  - No antibiotics
- ASA 3 + Contaminated or Dirty
  - Antibiotics
- ASA 3 + Systemic Signs of Infection
  - Antibiotics
- ASA 4-5 or High-risk Surgery
  - Antibiotics

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Perioperative Antibiotics

- How to Use
  - *Start 30-60 minutes before surgery*
  - *~ q 2 hours during surgery (or CRI?)*
  - *Stop within 24 hours after surgery*

Williams J. Antimicrobial prophylaxis: The why and how of antimicrobial prophylaxis. *BSAVA Companion*. 2018;2018(11):4-7.

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Perioperative Antibiotics

- Dentistry
  - *Almost never needed*
  - *Maybe high-risk patients?*
  - *Maybe patients with implants?*
  - *Same general principles*

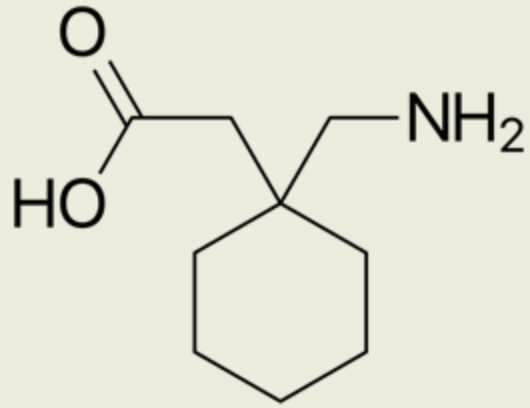
Williams J. Antimicrobial prophylaxis: The why and how of antimicrobial prophylaxis. *BSAVA Companion*. 2018;2018(11):4-7.

L.R. Jessen, P.P. Damborg, A. Spohr, et al. Antibiotic Use Guidelines for Companion Animal Practice (2nd ed.). The Danish Small Animal Veterinary Association, SvHKS, 2019.

Uses of Analgesics to Reconsider

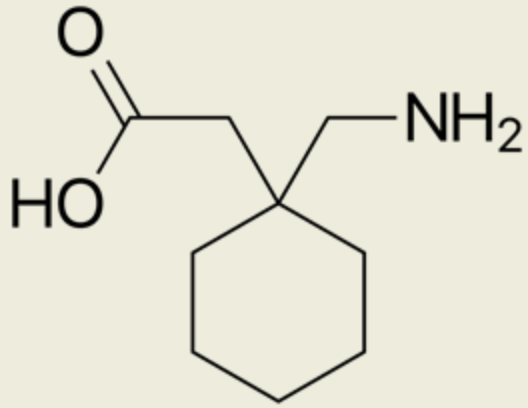
Gabapentin

Gabapentin



- Mechanism not completely understood
- Approved for post-herpetic neuralgia, RLS, some Sz types
- Pretty safe (sedation)
- Cheap

Gabapentin



- Evidence
  - *Gabapentin use has become widespread and common, although **without supporting data**, especially in chronic pain conditions. It has **not been shown to be effective for acute pain in dogs**.*
  - *Gabapentin has become the "new tramadol," with widespread usage. While some practitioners report benefits anecdotally in both species and for a variety of pain conditions, **virtually no supporting data** are available at this time.*
  - *There is evidence to support its use as a behavioral modifier or stress reducer in cats*

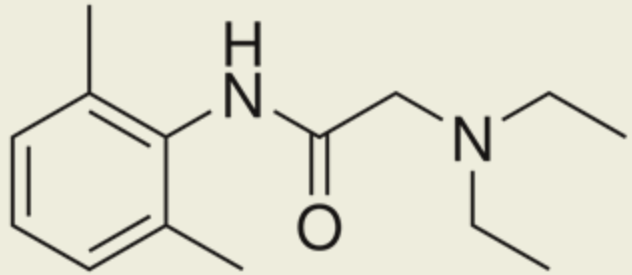
Gruen ME, Lascelles BDX, Colleran E, et al. 2022 AAHA Pain Management Guidelines for Dogs and Cats. *J Am Anim Hosp Assoc*. 2022;58(2):55-76.

Uses of Analgesics to Reconsider

Local Blocks

Mixing Drugs
Nocita?
At all?

Lidocaine + Bupivicaine



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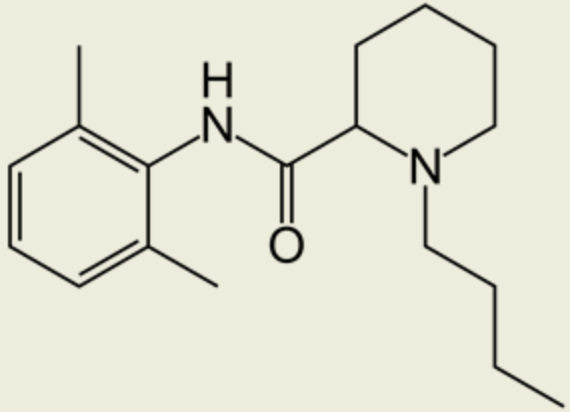
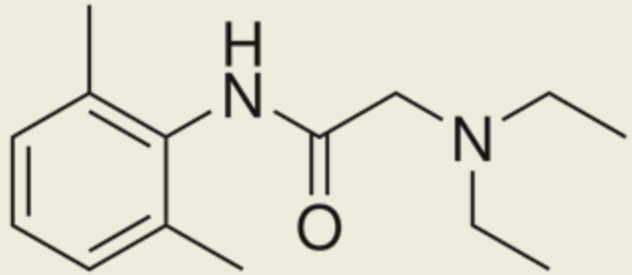


- Important variables
  - *pH*
  - *pKa*
  - *Protein binding*
  - *Concentration*

Lidocaine + Bupivicaine



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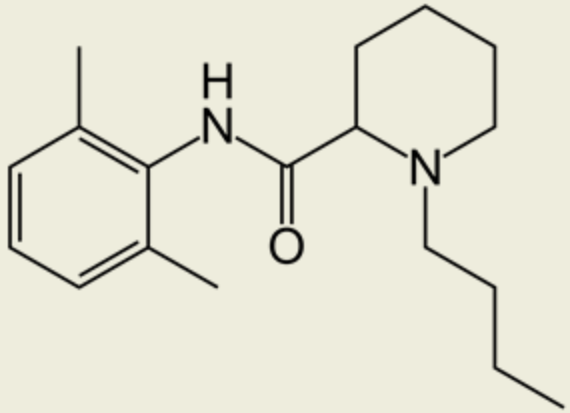
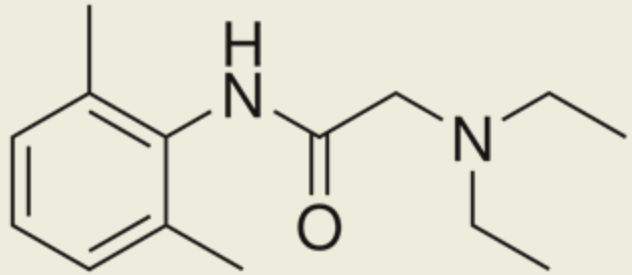


- Lidocaine
  - *Onset- instantaneous to few minutes*
  - *Duration 1-1.5hours*
- Bupivicaine
  - *Onset- 2-12 min*
  - *Duration- 2-8 hours*

Lidocaine + Bupivicaine



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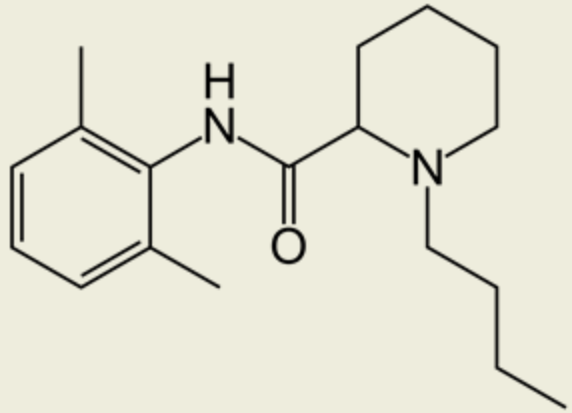
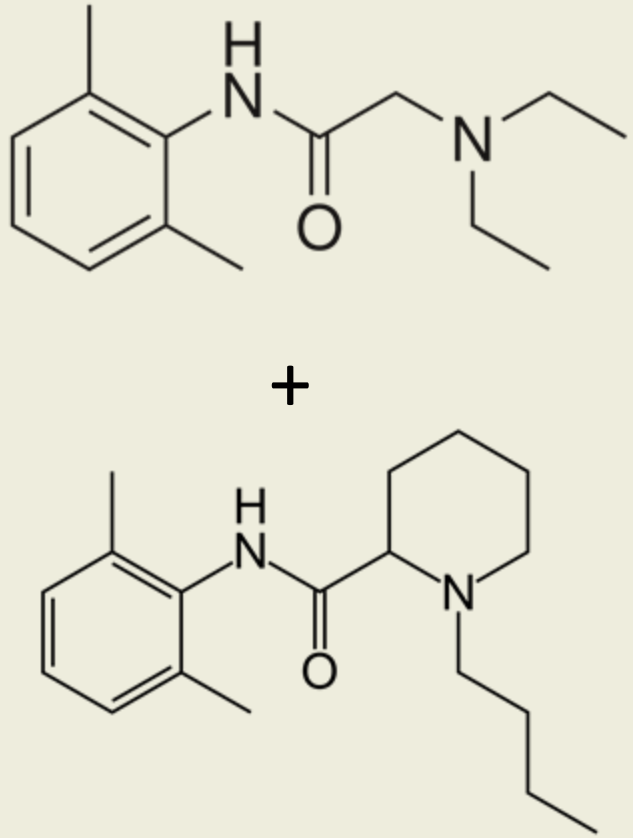


- Mixing lidocaine and bupivacaine
  - *Lowers pH of lidocaine, which can ionize more and slow onset*
  - *Raises pH of bupivacaine, which can cause precipitation*
  - *Reduces concentration of both*
    - *Reduces gradient for entry into nerve*
    - *Reduces how much is protein bound, which can reduce duration*

Lidocaine + Bupivicaine

- Mixing lidocaine and bupivacaine
  - *No difference in onset time from lidocaine alone*
  - *Shorter duration than bupivacaine alone*



Vesal N, Ahmadi M, Foroud M, Imani H. Caudal epidural anti-nociception using lidocaine, bupivacaine or their combination in cows undergoing reproductive procedures. Vet Anaesth Analg. 2013 May;40(3):328-32.

Lizarraga I, Janovyak E, Beths T. Comparing lidocaine, bupivacaine and a lidocaine-bupivacaine mixture as a metacarpal block in sheep. Vet J. 2013 Aug;197(2):515-8.

Lawal FM, Adetunji A. A comparison of epidural anaesthesia with lignocaine, bupivacaine and a lignocaine-bupivacaine mixture in cats. J S Afr Vet Assoc. 2009 Dec;80(4):243-6.

Nocita (liposomal bupivacaine)

- FDA Approved for
  - *CCL surgery in dogs*
  - *Declawing in cats*
- Pros
  - *Potentially longer duration of action*
- Cons
  - *Expensive!!*
  - *Does it work?*

Nocita (liposomal bupivacaine)

Middlestead, 2024	Nocita diluted 1:5 laparotomy incision in dogs	Pain scale, rescue	X	hydromorphone
Hixon, 2024	Nocita diluted 1:1 laparotomy incision in dogs	Pain scale, mechanical nociception	X	methadone, ketamine
Hollenbeck, 2024	Nocita diluted 1:1 soft-tissue surgery incision in dogs	Pain scale	X	variable

Local Anesthetics- Do They Work?

Local Anesthetics- Do They Work?

Freeman, 2023	bupivacaine vs other with OVE in cats		X/✅	mostly not significant effect, other drugs better
Pavlidou, 2021	bupivacaine or lidocaine with laparotomy in dogs		?	7 studies; weak evidence
Fausak, 2018	intratesticular lidocaine in cats		X	mixed and weak evidence
Fausak, 2018	intratesticular lidocaine in dogs		X/✅	beneficial if no pure μ-agonist given

Lawler, 2024	IP bupivacaine with OVH in cats	Vitals, vaporizer setting, rescue analgesia, pain scale	X	Buprenorphine, ketamine, dexmedetomidine, robenacoxib
Gomes, 2024	Lidocaine in pedicle with OVH in dogs	Vitals, anesthesia needs, pain scale	X	morphine
Kazmir-Lysak, 2023	IP and incisional, ropivacaine, OVH in dogs	Two pain scales	X	Morphine, ketamine, buprenorphine, carprofen
Brioschi, 2023	IP and incisional lidocaine or ropivacaine with laparotomy in dogs	Two pain scales	✅	Methadone, dexmedetomidine, meloxicam; **lidocaine not always > placebo**
Heitzman, 2023	IP ropivacaine, OVE in cats	Two pain scales	X	Ketamine, medetomidine, butorphanol, tolfenamic acid
Garbin, 2023	TAP with bupivacaine, OVH in cats	Rescue, pain scale	✅	Buprenorphine, acepromazine, EMLA for IVC

Vicasillas, 2022	TAP, QLB, Epidural with OVH in dogs	Rescue analgesia, recovery behavior, vitals	X/✅	Recovery appeared better, no other consistent pattern of effect
Josso, 2022	US-guided rectus sheath infiltration bupivacaine with OVE in cats	Vitals, anesthetic needs, rescue analgesia, pain scale, owner questionnaire	X	Dexmedetomidine, morphine, robenacoxib; only iso amt differed
Nejamkin, 2020	Lidocaine epidural with OVH in dogs	Vitals, rescue, pain scale	✅	Dexmedetomidine, tramadol, meloxicam
Fudge, 2019	Bupivacaine in pedicle, suspensory ligament, uterus, and SQ in cats	Two pain scales	X/✅	buprenorphine, ketamine, dexmedetomidine-only difference seen in the largest size group (> 2.7kg)
Vicente, 2018	Incisional lidocaine, bupivicaine, OVH, cats	Vitals, anesthetic requirements	X/✅	Buprenorphine, medetomidine, meloxicam

Local Anesthetics- Do They Work?

- It Depends
  - *Which ones*
  - *How employed*
  - *How assessed*
  - *What is done*
  - *What other analgesia is used*

Local Anesthetics- Do They Work?

- So….?
  - *Don’t rely on them*
  - *Don’t skimp on other analgesics*
  - *Targeted used (e.g. epidurals, nerve blocks) probably better*

Uses of Analgesics to Reconsider

Steroids for IVDD

Steroids for IVDD

- Better, Worse, or Same as NSAIDs?
  - *There is limited evidence that corticosteroid use is associated with **poorer outcome** and **decreased quality of life** as well as a **higher rate of recurrence** compared to nonsteroidal anti-inflammatory drugs (NSAIDs) in ambulatory dogs managed medically.*
  - *[there is] **insufficient evidence** to support corticosteroid use for neuroprotective purposes*
  - *not recommended for routine use in medical management of the acute phase*

Olby NJ, Moore SA, Brisson B, et al. ACVIM consensus statement on diagnosis and management of acute canine thoracolumbar intervertebral disc extrusion. *J Vet Intern Med*. 2022;36(5):1570-1596

Miscellaneous Practices to Reconsider

ACE-Inhibitors

ACE-Inhibitors

- MMVD without Heart Failure (Stages B1, B2)
  - *administration of ACEIs results in little to no difference in the risk of development of congestive heart failure [high confidence]*
  - *may result in little to no difference in cardiovascular-related and all-cause mortality [low confidence]*
  - *Guidelines of human American and European cardiology associations do not recommend its use in patients with preclinical chronic mitral valve disease*
  - *the ACVIM consensus does not recommend its use in B1 stage and only half of the panel members recommended it for dogs in B2 stage*

Donati P, Tarducci A, Zanatta R, et al. Angiotensin-converting enzyme inhibitors in preclinical myxomatous mitral valve disease in dogs: systematic review and meta-analysis. J Small Anim Pract. 2022 May;63(5):362-371

ACE-Inhibitors

- Congestive Heart Failure
  - *Some benefits, mostly in dogs with DCM not MMVD*
  - *No benefit when added to pimobendan and furosemide in dogs with MMVD*
  - *Benazepril + spironolactone beneficial in dogs with MMVD (but no pimobendan)*

Wess G. The VALVE Study - Is Triple Therapy Superior to Double Therapy for Heart Failure Treatment Due to Endocardiosis? - Vasotop® (Ramipril) in Addition to Lasix® and Vetmedin® in Canine Endocardiosis (VALVE Study). ACVIM 2017

Coffman M, Guillot E, Blondel T, Garelli-Paar C, Feng S, Heartsill S, Atkins CE. Clinical efficacy of a benazepril and spironolactone combination in dogs with congestive heart failure due to myxomatous mitral valve disease: The BEnazepril Spironolactone STudy (BESST). J Vet Intern Med. 2021;35(4):1673-1687.

Ettinger SJ, Benitz AM, Ericsson GE et al. Effects of Enalapril Maleate on Survival of Dogs with Naturally Acquired Heart Failure. J Am Vet Med Assoc 213[11]:1573-1577 1998

COVE Study Group. Controlled clinical evaluation of enalapril in dogs with heart failure: results of the Cooperative Veterinary Enalapril Study Group. The COVE Study Group. J Vet Intern Med 9[4]:243-52 1995

IMPROVE Study Group. Acute and short-term hemodynamic, echocardiographic, and clinical effects of enalapril maleate in dogs with naturally acquired heart failure: results of the Invasive Multicenter PROspective Veterinary Evaluation of Enalapril study. The IMPROVE Study Group. J Vet Intern Med 9[4]:234-42 1995

ACE-Inhibitors

- Congestive Heart Failure
  - *Some benefits, mostly in dogs with DCM not MMVD*
  - *No benefit when added to pimobendan and furosemide in dogs with MMVD*
  - *Benazepril + spironolactone beneficial in dogs with MMVD (but no pimobendan)*
  - *Stage C MMVD- recommended (Level of Evidence = Low)*

ACE-Inhibitors

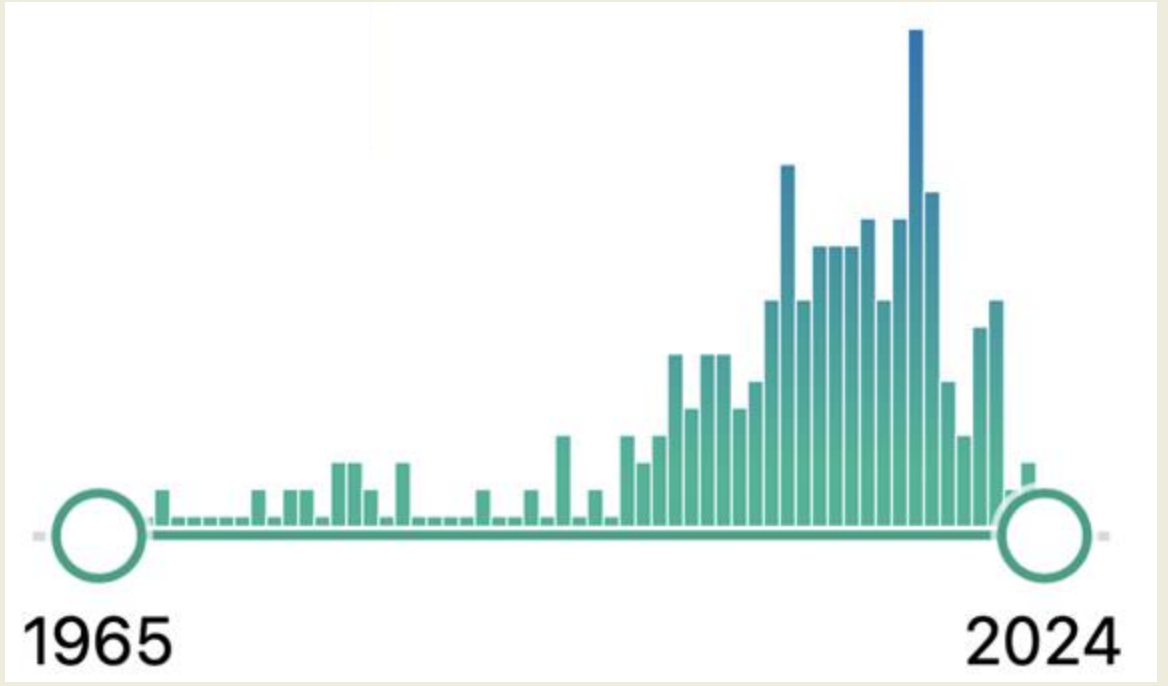
- Congestive Heart Failure
  - *Some benefits, mostly in dogs with DCM not MMVD*
  - *No benefit when added to pimobendan and furosemide in dogs with MMVD*
  - *Benazepril + spironolactone beneficial in dogs with MMVD (but no pimobendan*
  - *Stage C MMVD- recommended (Level of Evidence = Low)*
  - *No clear evidence in cats*

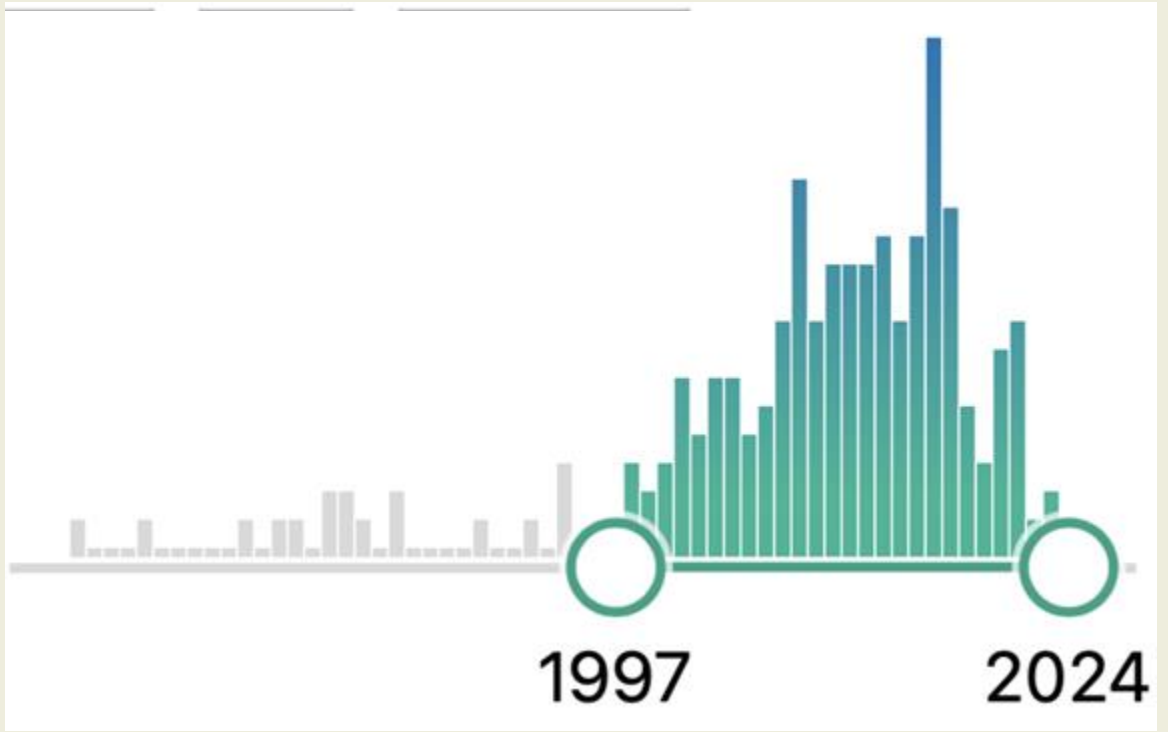
Miscellaneous Practices to Reconsider

Glucosamine

Glucosamine

- *OA Prevention, Mitigation, Analgesia, etc…*
  - *Pubmed- 176 clinical trials*
  - *Pubmed- 50 systematic reviews*
    - *60% some effect, 40% no effect*





Glucosamine

- *OA Prevention, Mitigation, Analgesia, etc…*
  - *Seems to provide chondroprotective effects and less inflammatory biochemical response in approximately half of the evaluations.*
  - *However, these effects are inconsistent between the clinical and the preclinical studies*
  - *A possible caregiver placebo effect may explain some of the beneficial responses observed in clinical trials with dogs.*

Barbeau-Grégoire M, Otis C, Cournoyer A, et al. Systematic Review and Meta-Analysis of Enriched Therapeutic Diets and Nutraceuticals in Canine and Feline Osteoarthritis. *Int J Mol Sci*. 2022;23(18):10384.

Glucosamine

- *OA Prevention, Mitigation, Analgesia, etc…*

American College of Rheumatology and the Arthritis Foundation

  - *Recommends against glucosamine alone or with chondroitin because treatment does not improve knee and hip OA in studies without industry funding*

Kolasinski SL, Neogi T, Hochberg MC, et al. 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. Arthritis Care Res. 2020;72(2):149-162.

Glucosamine

- *OA Prevention, Mitigation, Analgesia, etc…*

American Academy of Orthopedic Surgeons

  - *May be helpful in reducing pain and improving function…however, the research is inconsistent/limited*

Brophy RH, Fillingham YA. AAOS Clinical Practice Guideline Summary: Management of Osteoarthritis of the Knee (Nonarthroplasty), Third Edition. JAAOS - J Am Acad Orthop Surg. 2022;30(9):e721.

Glucosamine

- *OA Prevention, Mitigation, Analgesia, etc…*
  - *“Lack of evidence” to draw a definitive conclusion*

Mosley C, Edwards T, Romano L, et al. Proposed Canadian Consensus Guidelines on Osteoarthritis Treatment Based on OA-COAST Stages 1–4. Front Vet Sci. 2022;9.

Glucosamine

- *OA Prevention, Mitigation, Analgesia, etc…*
  - *3-4 of 9 panel members sometimes recommend glucosamine*

Cachon T, Frykman O, Innes JF, et al. COAST Development Group's international consensus guidelines for the treatment of canine osteoarthritis. Front Vet Sci. 2023;10:1137888.