



# Making Evidence-based Decisions

# Tallulah



- 13 year old, FS Labrador
- Mild progressive HL weakness x years

What about glucosamine?





# Steps of EBVM

1. Ask useful questions
2. Find relevant evidence
3. Assess the value and reliability of the evidence
4. Draw a conclusion/Make a decision
5. Assign a level of confidence to your conclusion



# Ask Useful Questions

P- patient, problem

I- intervention, exposure

C- comparator

O- Outcome



# Ask Useful Questions

## P- Patient, Problem

- 13 year old FS Labrador retriever
  - systemically healthy
  - moderately overweight
  - mild gradually progressive HL weakness
  - moderate bilateral hip osteoarthritis
- 
- Dog with OA



# Ask Useful Questions

## I- Intervention, exposure

- Oral glucosamine, injectable
- +/- chondroitin, MSM, green-lipped muscle, fish oil, turmeric, Vitamin C, etc.....
- Pills, capsules, chewable treats, liquids
- Cosequin, Dasuquin, NaturVet, human products, etc.....
- Oral glucosamine +/- chondroitin



# Ask Useful Questions

## C- Comparator

- Doing nothing (education!!!)
- Weight loss
- Physical therapy, chiropractic, massage
- Acupuncture
- NSAIDs, analgesics
- Other supplements/nutraceuticals (fish oil, herbals, turmeric, MSM, etc.....)
- Total hip replacement
  
- Nothing (placebo), NSAID



# Ask Useful Questions

## Q- Outcome

- Hunting
  - Agility competition
  - Activities of daily living
  - Free of pain
  - Free of lameness
- 
- Reduced pain and/or lameness



# Ask Useful Question

P- Dog with OA

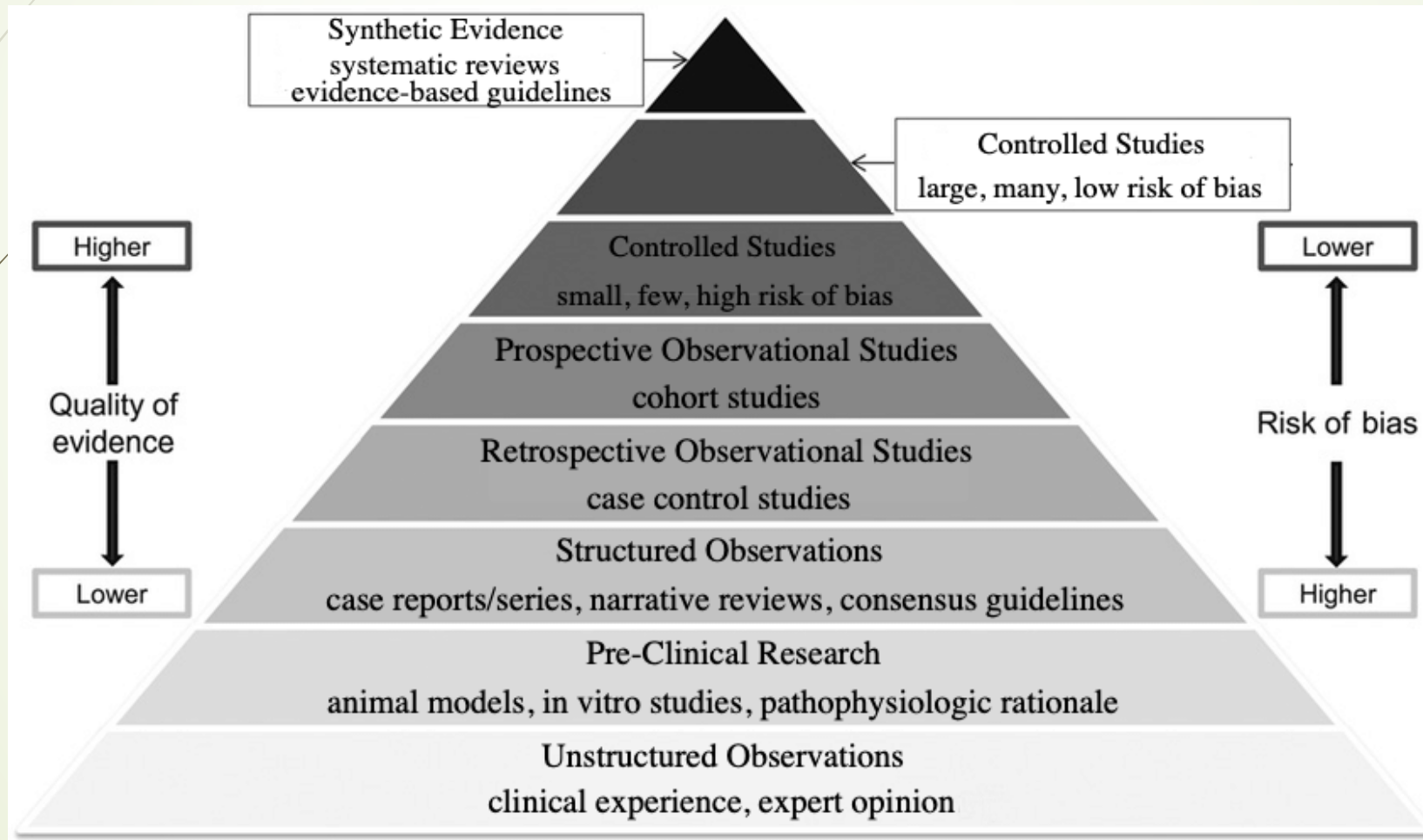
I- oral glucosamine (+/- chondroitin)

C- nothing or NSAID















O- pain, lameness



# Hierarchy of Evidence



# SEARCHING.....

-  PubMed
-  VetSRev
-  VetMed Resource
-  DeepDyve
-  Best Bets for Vets
-  RCVS Knowledge Summaries
-  RCVS EBVM resources
-  AAHA CPGs
-  ACVIM Consensus Statements
-  AAFP CPGs
-  WSAVA CPGs
-  IRIS CKD CPGs
-  AHS Heartworm CPGs
-  WAVD CPGs



# Synthetic Literature

## Clinical Practice Guidelines-

### AAHA Pain Management

*Various other strategies [beyond NSAID, Adequan, EFA] can be and often are employed, but currently their supporting evidence is weak, conflicting, or altogether lacking at present.*



# Synthetic Literature

## Systematic Reviews-

*1 study included, good quality, no benefit*

Aragon CL, et al. Systematic review of clinical trials of treatments for osteoarthritis in dogs. 2007

*Low quality & quantity of evidence, no overall recommendation*

Sanderson RO, et al. Systematic review of the management of canine osteoarthritis. 2009

*The global strength of evidence of efficacy was low...In addition, results were contradictory in the 2 studies conducted in dogs*

Vandeweerd JM, et al. Systematic review of efficacy of nutraceuticals to alleviate clinical signs of osteoarthritis. 2012



# Synthetic Literature

## Critically Appraised Topics-

There are a lack of good quality clinical trials to answer this question. There is a suggestion that carprofen is superior to glucosamine/chondroitin supplements in reducing clinical signs of osteoarthritis but better quality evidence is required to definitively answer the question.



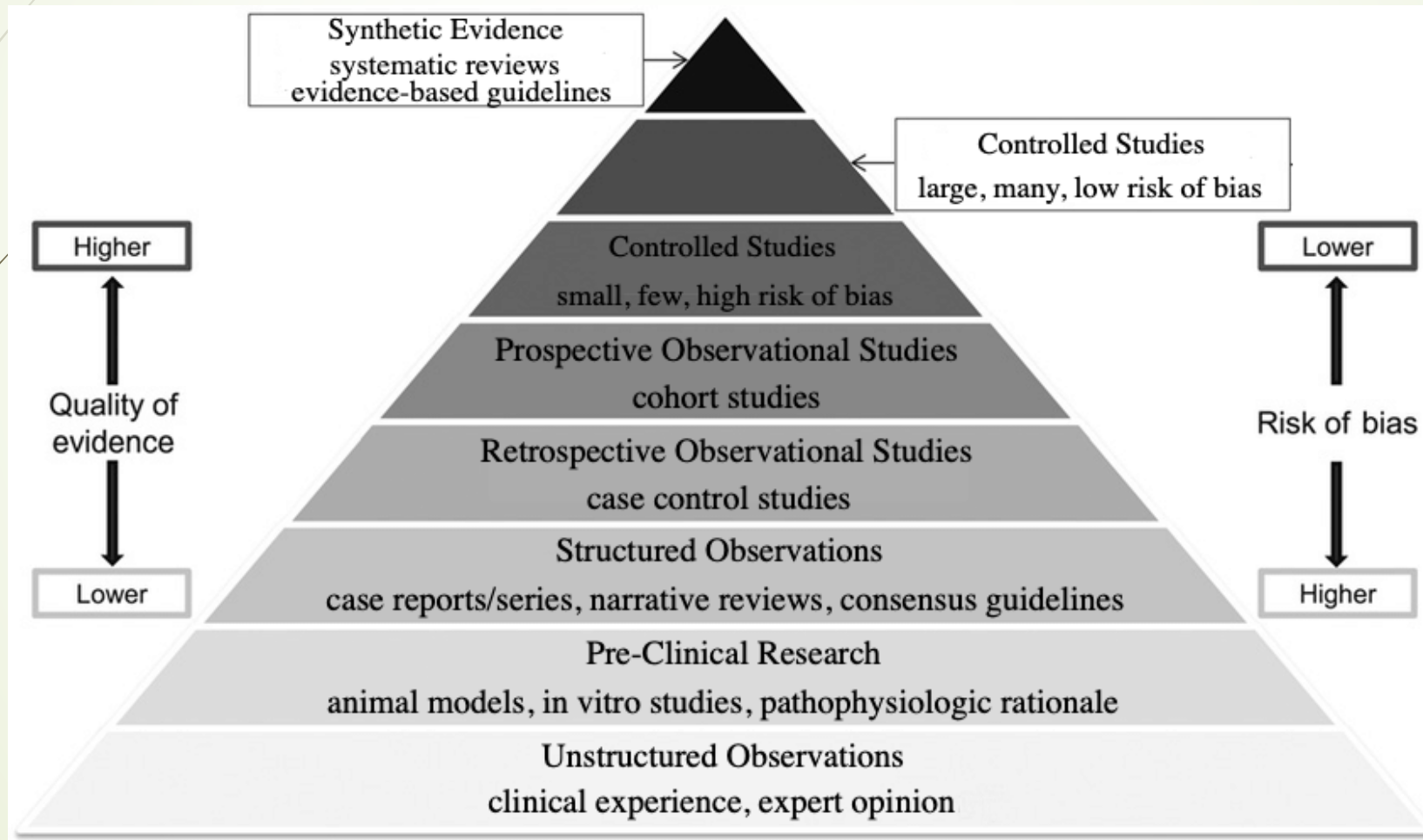
# Synthetic Literature

## Critically Appraised Topics-

*Two studies, mixed results, better quality study found no benefit to glucosamine and carprofen was superior*



# Hierarchy of Evidence







# Synthetic Literature

## Human Clinical Guidelines

- > 15 that mention glucosamine for OA
- Evidence is weak and mixed
- Most do not recommend or are neutral

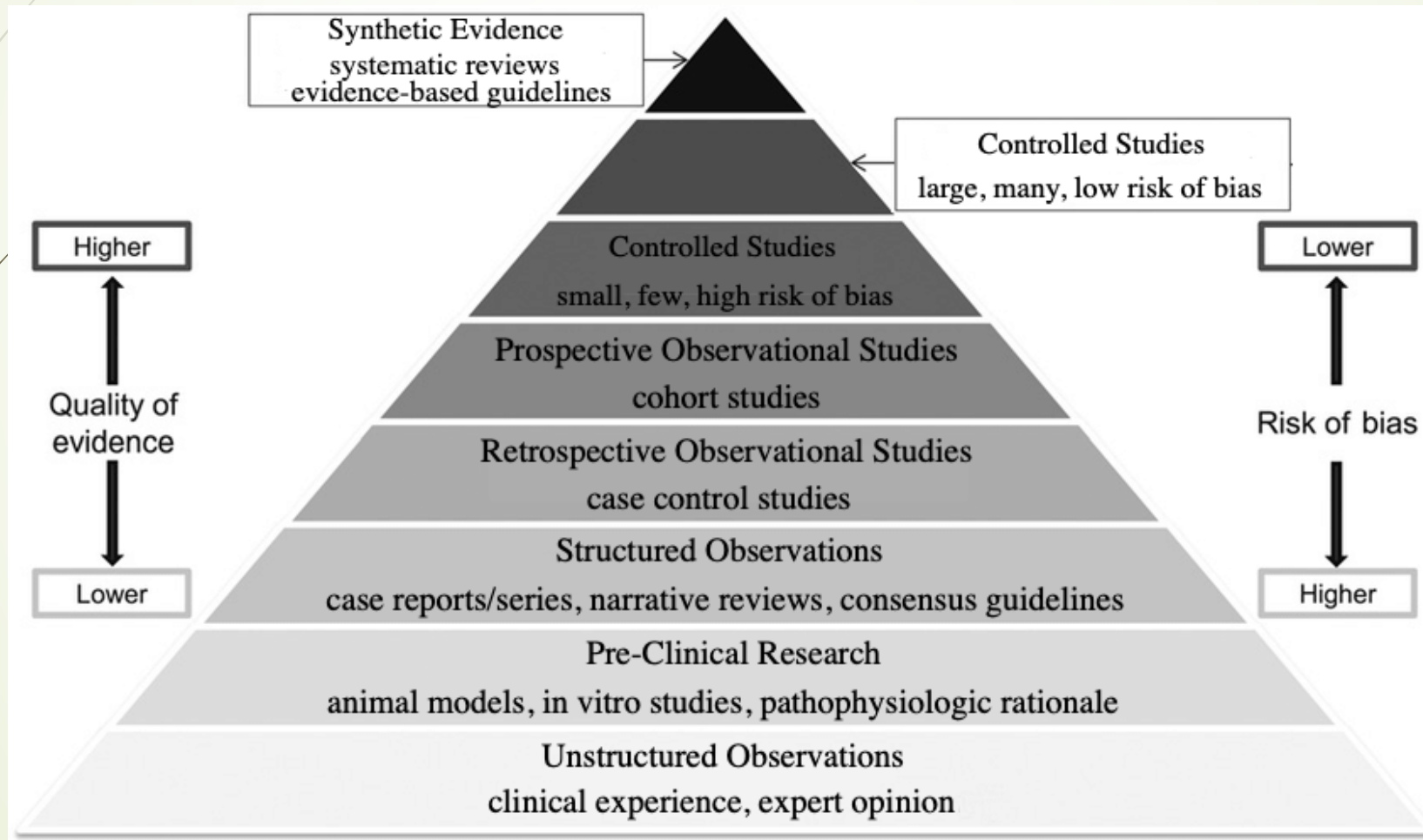


# Synthetic Literature

## Human Systematic Reviews-

- Many more than in veterinary medicine
- Variable conclusions
- Applicability??

# Hierarchy of Evidence





# Primary Literature

- Clinical trials- already evaluated in synthetic literature?

# Critical Appraisal





# Primary Literature

## Moreau, 2003

- Randomized, double-blinded, placebo-controlled trial
- Groups- carprofen, meloxicam, a glucosamine-chondroitin, placebo
- 71 subjects (3 d/o)
- Evaluated after 30 and 60 days
- Objective variables improved with carprofen and meloxicam, not glucosamine nor placebo
- Subjective findings of vets agreed w/ objective
- Subjective assessment by owners identified improvement only with meloxicam

Moreau M, Dupuis J, Bonneau NH, Desnoyers M. Clinical evaluation of a nutraceutical, carprofen and meloxicam for the treatment of dogs with osteoarthritis. *Vet Rec.* 2003;152(11):323-329. <http://www.ncbi.nlm.nih.gov/pubmed/12665145>. Accessed December 11, 2018.

# Primary Literature

## McCarthy, 2007

- Double-blinded, positive control, no placebo, alternate allocation
- 42 subjects (6 d/o, 5 in glucosamine group)
- Groups- glucosamine, carprofen
- Evaluated 3x over 70 days
- Subjective outcome measures
- Carprofen improved at most points, 5 measures
- Glucosamine improved at final point, 3 measures

1McCarthy G, O'Donovan J, Jones B, McAllister H, Seed M, Mooney C. Randomised double-blind, positive-controlled trial to assess the efficacy of glucosamine/chondroitin sulfate for the treatment of dogs with osteoarthritis. *Vet J.* 2007;174(1):54-61. doi:10.1016/j.tvjl.2006.02.015



# Primary Literature

## Gupta, 2012

- Randomized, double-blinded, placebo controlled
- 7-10 per group (total=?, d/o=?)
- Evaluated every 30 days for 150 days
- Subjective outcome and GFP
- Groups- collagen, glucosamine/chondroitin, collagen+ glucosamine/chondroitin, placebo
- All Tx groups showed significant changes from baseline after 60d on subjective
- Only collagen showed change on GFP (not combo or glucosamine alone)

# Primary Literature

## Alves, 2017

- Randomized, controlled, double-blinded
- 10 in Tx groups, 5 in control group (1 d/o in control group)
- Evaluated at 7 times over 40 days
- Subjective outcomes
- Groups- glucosaminine+chondroitin+hyaluronic acid vs carprofen (at Rx dose for 1 week then 50% dose remainder of the study)
- No effects for any group and no difference, though some individuals improved at some points

Alves J, Santos A, Jorge P. Effect of an Oral Joint Supplement When Compared to Carprofen in the Management of Hip Osteoarthritis in Working Dogs. *Top Companion Anim Med.* 2017;32(4). doi:10.1053/J.TCAM.2017.10.003

# Primary Literature

## Scott, 2017

- Randomized, double-blinded, placebo controlled
- 30 dogs in each group (13 d/o, 6 in Tx and 7 in control)
- Groups- Dasaquin (glucosamine, chondroitin, avocado/soybean unsaponifiables)
- Subjective owner pain instrument and objective activity counts
- Both groups improved on subjective measure with no difference between them
- No change for either group in activity

Scott, RM Evans, R. Conzemius, MG. Efficacy of an Oral Nutraceutical for the Treatment of Canine Osteoarthritis. A Double-Blind, Randomized, Placebo-Controlled Prospective Clinical Trial. *Vet Comp Orthop Traumatol.* 2017;30(5). doi:10.3415/VCOT-17-02-0020



# Primary Literature

- Moreau, 2003- no effect
- McCarthy, 2007- some effect
- Gupta, 2011- some effect
- Alves, 2017- no effect
- Scott, 2017- no effect



# Other Evidence

## Expert Opinion-

- Mixed, no consensus
- Low reliability

## My Opinion-

- Low reliability



# Body of Evidence

- Not much veterinary clinical trial evidence
  - Variable, generally low quality
  - Mixed results
  - Balance negative
- Large amount of human clinical trial evidence
  - Mixed results, highest quality suggests little to no benefit
- Other evidence
  - Pre-clinical- potential benefits, little risk
  - Opinion- Everyone has one....



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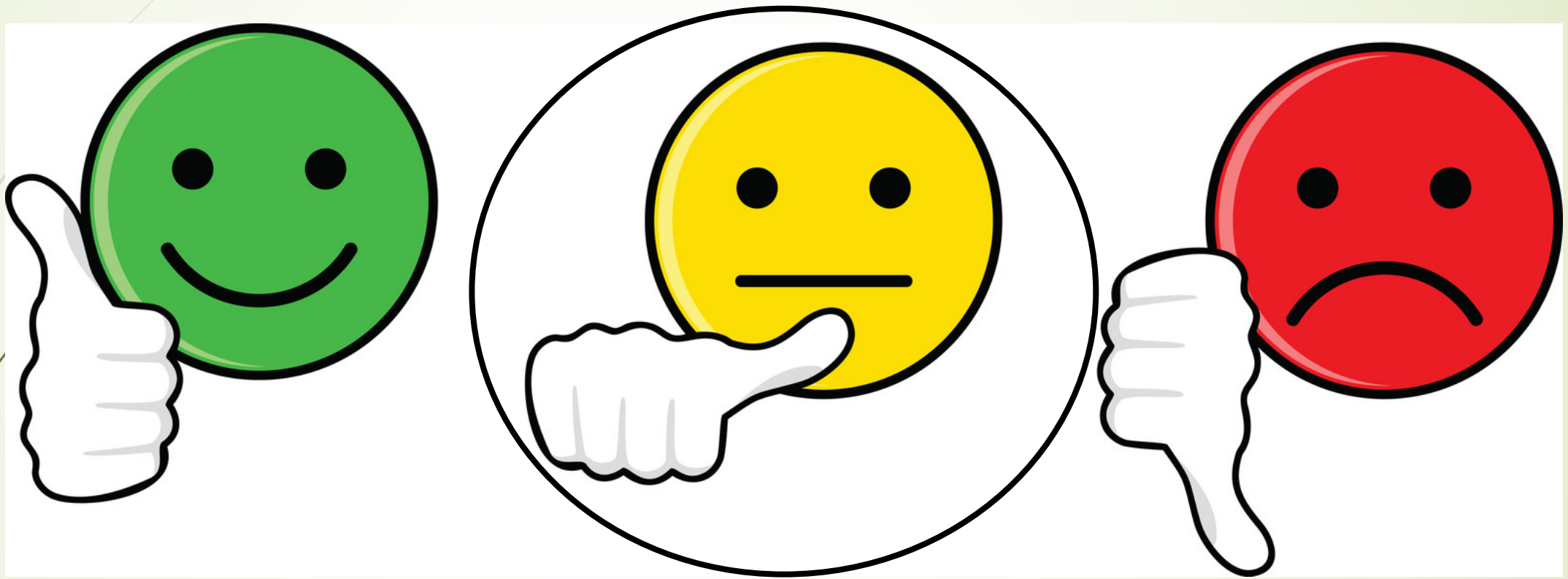
# Evidence-based Decision

<b>I</b>	Benefit >>> Risk	<b>Should</b> be performed, is <b>recommended</b>
<b>IIa</b>	Benefit >> Risk	Is <b>reasonable</b> to perform
<b>IIb</b>	Benefit $\geq$ Risk	<b>May be considered</b>
<b>III</b>	Risk > Benefit	<b>Should not</b> be performed



# Evidence-based Decision

- Recommend the intervention
- Recommend against the intervention
- Recommend something else instead/in addition
- Take no position
- Sell the intervention to the client?
- What do you say to the client?



# Bastet



- 1 year old, FS Ragdoll
- Sneezing, oculonasal d/c, lethargy

What about  
COVID-19?



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# Ask Useful Questions

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I- intervention, exposure

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O- Outcome



# Ask Useful Questions

P- cat owners

I (E)- cats with URI symptoms

C- no cat (asymptomatic cat?)

Q- SARS-CoV-2 transmission





# Ask Useful Questions

P- cats

I (E)- having URI symptoms

C- asymptomatic

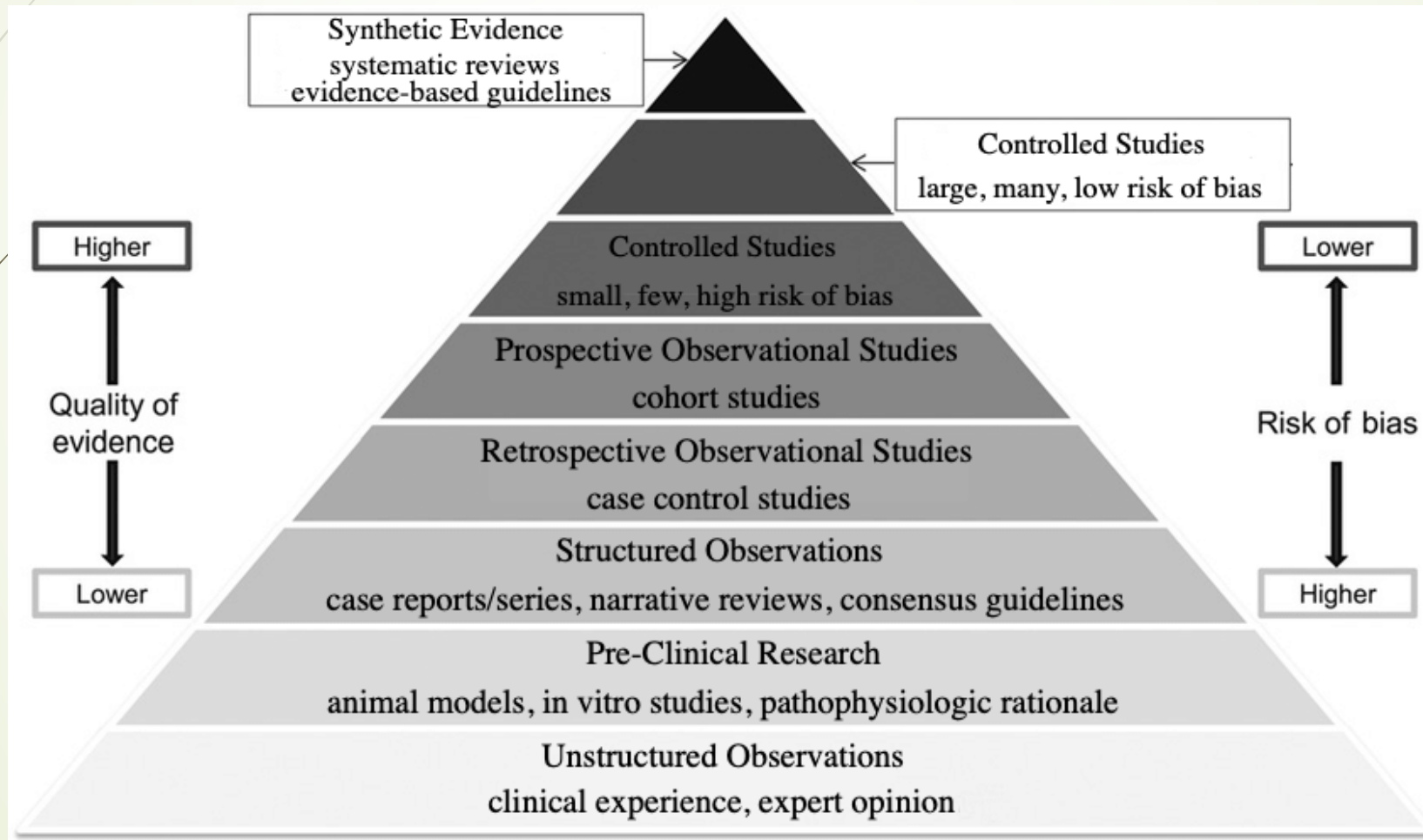
Q- SARS-CoV-2 infection

















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# Hierarchy of Evidence




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# Synthetic Literature

## Systematic Reviews-



Home COVID-19 and Animals Tutorials External Resources Protocols Our Partners

## COVID-19 and Animals



A rapid review was undertaken for two questions of interest to veterinarians related to SARS-CoV-2, the virus associated with the disease COVID-19. As little evidence is available, we also assess other known human corona virus SARS and MERS. The full updated rapid review [is available here](#). This is not peer reviewed.

History: Posted 2:20 am 20th March, updated 4:40 20th March, updated 5:50 21st March, updated 12:57 am 27th March 2020

**Most recent update: 29th April, 2020 12:30 AM CST.**

NB if you have studies that are relevant or that we missed please forward them so we can update (oconn445@msu.edu)



# Synthetic Literature

## Systematic Reviews-

A rapid review was undertaken for two questions of interest to veterinarians-

- Whether domestic animals can be infected with SARS-CoV- 2
- Whether they could serve as fomites for SARS-CoV-2.

Searches were conducted using

- Michigan State University Web of Science™ Interface
- BioRxiv
- MedRxiv
- ProMED-mail

The review is updated every 3-4 days.



# Synthetic Literature

## Systematic Reviews-

- Case Reports
  - Three cats (Hong Kong, Belgium, New York) with COVID-19 + owners tested positive
  - One cat (New York) with COVID-19 – owners tested positive
  - 8 cats (Hong Kong) living with COVID-19 + owners tested negative
  - 9 cats (France) living with COVID-19 + owners tested negative
- Challenge Studies
  - Cats were infected directly and then indirectly by cats in adjacent cages (directed airflow)
- Serologic Surveys
  - Wuhan, China- 26/102 cats tested had antibodies
    - Included COVID-19+ and – owners, vet hospitals, strays
  - Harbin, China- 0/87 cats tested had antibodies
    - No information about context
- **No cases of cat-to-human transmission have been reported.**





# Synthetic Literature

## Systematic Reviews-

- **There is no evidence regarding the potential for cats to be fomites**
- 



# Other Literature

## Worms & Germs

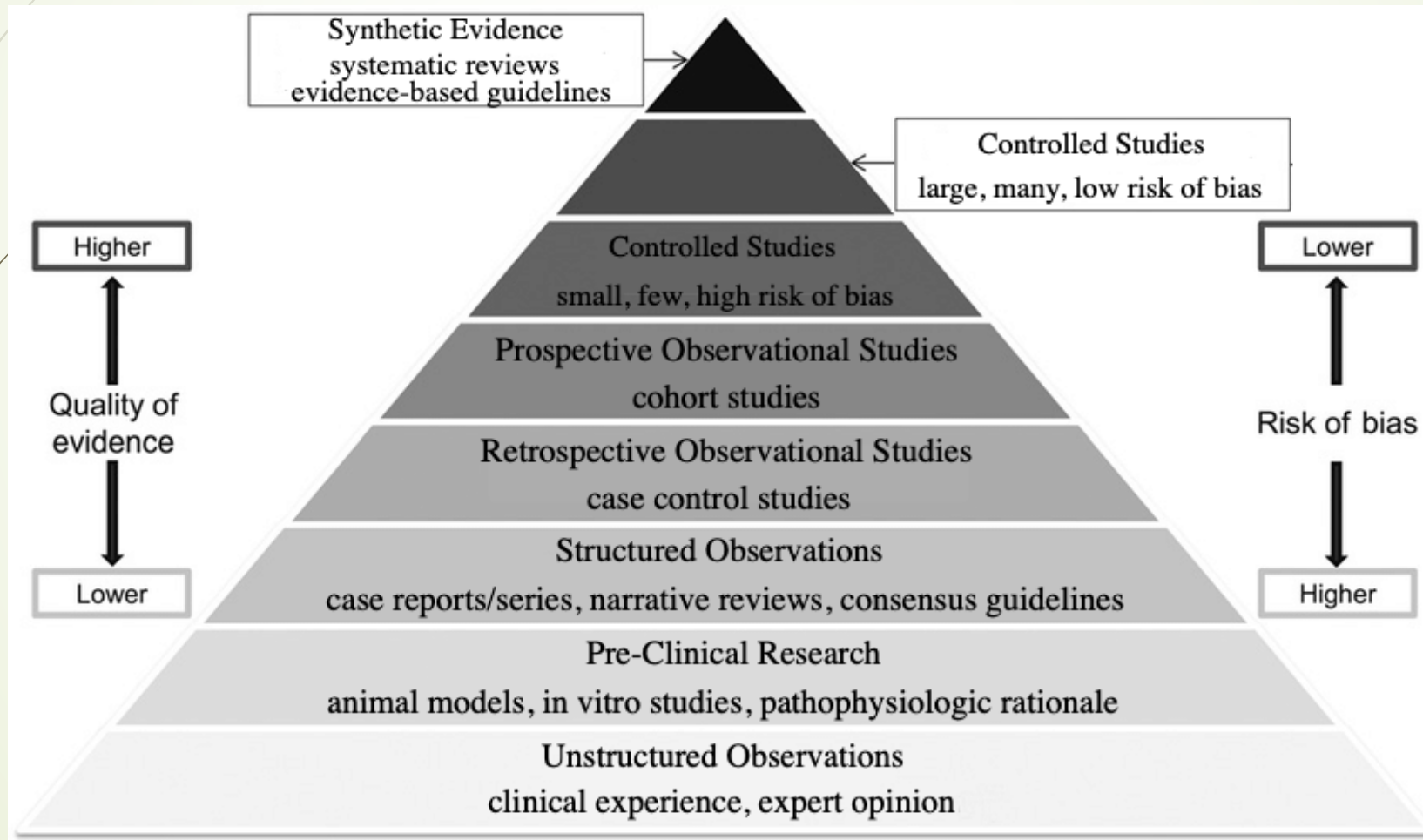
- Case Reports
  - One cat (France) with COVID-19 + owners tested positive
  - Five tigers and three lions (Bronx Zoo) tested positive



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# Hierarchy of Evidence





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# Evidence-based Decision

- Risk is probably low but not zero
- Uncertainty is very high
- Cat much more likely to get COVID-19 from owner than owner to get it from cat
- Reasonable Precautions for Cat owners (CDC)
  - Do not let cats interact with people or other animals outside the household.
  - Keep cats indoors when possible to prevent them from interacting with other animals or people.
  - People sick with COVID-19 should avoid contact with pets and other animals.
  - When possible, have another member of your household care for your pets while you are sick.
  - If you must care for your pet or be around animals while you are sick, wear a cloth face covering and wash your hands before and after you interact with them.



# Evidence-based Decision

- Reasonable Precautions for Cat owners (CDC)
  - If cat tests positive, isolate as much as possible at home or at veterinary facility and minimize contact with persons at high risk
- Testing cats is generally not recommended
  - Limited resources
  - Uncertainty about reliability and interpretation
  - Lack of available interventions
  - People freak out!





# Evidence-based Decision

- Reasonable Precautions for Vets (CDC)
  - Postpone non-urgent veterinary visits and elective procedures until regular business operations resume in your community
  - Screen companion animals for exposure to people with COVID-19
  - Treat animals suspicious for COVID-19 or with COVID-19 + owners as possible sources of infection.
  - Testing is generally not recommended

Animal History	Facemask	Eye Protection (face shield, goggles)	Gloves	Protective Outerwear (gown or coveralls <sup>3</sup> )	N95 Respirator or Suitable Alternative <sup>4</sup>
Healthy companion animal <b>without</b> exposure to a person with COVID-19 compatible symptoms <sup>1, 2</sup>	N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>
Companion animal with an illness that is <b>not</b> suspicious of SARS-CoV-2 infection <sup>5</sup> AND <b>without</b> exposure to a person with COVID-19 compatible symptoms <sup>1, 2</sup>	N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>	N <sup>1</sup>
Companion animal that is <b>not</b> suspicious of SARS-CoV-2 infection <sup>5</sup> BUT <b>has</b> exposure to a person with COVID-19 compatible symptoms	Y	N <sup>1</sup>	Y	N <sup>1</sup>	N <sup>1</sup>
Companion animal with an illness that is suspicious of SARS-CoV-2 infection <sup>5</sup>	Y	Y	Y	Y	N <sup>7</sup>
Aerosol-generating procedure for <b>any</b> animal <b>without</b> an exposure to a person with COVID-19 compatible symptoms <sup>6</sup>	Y	Y	Y	Y	N <sup>7</sup>
Aerosol-generating procedure for <b>any</b> animal <b>with</b> an exposure to a person with COVID-19 compatible symptoms <sup>6</sup>	N	Y	Y	Y	Y
Any procedure where a person with suspected or confirmed COVID-19 will be present	N	Y	Y	Y	Y



# Steps of EBVM

1. Ask useful questions
2. Find relevant evidence
3. Assess the value and reliability of the evidence
4. Draw a conclusion/Make a decision
5. **Assign a level of confidence to your conclusion**





# Steps of EBVM

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