Under the following headings, craft the concise, specific phrases that will appear in your abstract and bolded in your proposal body as the core pieces around which your proposal is constructed. Provide sufficient concise detail (key terms, phrases) for the reviewer to conclude: 1) that you know what you are doing, 2) that you are doing it correctly and 3) that they are getting the best return on their investment. Where necessary, cite published empirical evidence.

Aim for 2 pages maximum, identical to proposal (1 inch margins, 1.5 line spacing and 10 point font) with line numbers for class reviewer reference using these suggested headings (modified from Hulley 3rd, pg 15):

Proposal Title – The Crucial ‘What’s this all about?’ First Impression

Concisely provide maximum information on the problem you are addressing and the nature of your approach in a manner that positively engages the reviewer, leaving them with a positive first impression.

You want the reviewer to have a good idea of what your study is about after reading only the title and anticipating finding further detail in the rest. Leaving them wondering what the heck this is all about is not in your favor.

Problem Significance – The Critical ‘Why do this?’ Hook

With fewer than four concise sentences, answer the reviewers’ “so what?” question, framing your answer in impactful concepts such as amount of animal suffering, sickness or death, clearly indicating why the problem needs a solution in the general scheme of veterinary medicine. For both scientists expert on this topic and those not, carefully define the knowledge gap and how you propose to fill it with your study will fill it. You want the reviewer to conclude that based on the facts this is a big and important problem you’re tackling, no matter their previous familiarity. If they disagree or are left thinking ‘so what,’ you’re done.

Primary Research Question – ‘What are you asking?’ (P&W Chap 7, Holmes Chap 2, Hulley 4th Chap 2, R&C Chap. 2)

State your overall research hypothesis as a concise, specific question that clearly is objectively testable as written, containing the comparison and the outcome measure difference in your target group.

After reading this, you want the reviewer to conclude that this is an important question testable in such a manner that the results either definitively support or definitively refute your hypothesis.

Specific Aim(s) – The Critical ‘What exactly will you do?’ Hook (Review on-line examples)

Provide bulleted or numbered specific aims, at least one but no more than four single sentences, each concisely describing a logically sequenced (but not dependent) major step with a clearly defined deliverable or accomplishment (key words - establish, identify, characterize, compare, correlate, demonstrate, validate), necessary to answer the above question. These should stand alone when read by a knowledgeable reader with no logical holes or weak spots.

Study Design Type & Structure – ‘How will you do it?’ Hook (P&W Part III, R&C Chap. 3-4, Holmes Chap. 7-12, Hulley 4th Chap. 7-12)

Describe the strongest feasible study design name or structure (e.g. RBCT, case-control, cohort) including the critical key components, such as direction (retrospective, cross-sectional, prospective), experimental or observational and if experimental the basis that makes the comparison experimental (e.g., randomized selection or allocation), the nature of the control subjects and the comparison timing. Check that all the elements from the appropriate research reporting guideline (e.g., ARRIVE, CONSORT, STARD - see syllabus) are included.

You want the reviewer to conclude that you are using the strongest study design, that you know how to execute all the parts correctly, and that the result will be a strong primary publication filling the knowledge gap.

Relevant reporting guideline – Which research reporting guideline applies to this study design?

State the research reporting guideline from EQUATOR http://www.equator-network.org/, listing all the information (e.g., selection and exclusion criteria, blinding procedures, . . .) that will be required in a paper reporting your research findings.

Variables – ‘What exactly will you measure?’ (P&W Part II, Holmes Chap. 4, Hulley 4th Chap. 4, R&C Chap. 5)

Outcome (dependent):

What will you measure, why is this the best thing to measure, how will you measure it and why is this the best way to measure it? What are expected mean or median, range, and standard deviation if continuous? What is the potential systematic and random observer and laboratory variation across batches and time and how will you reduce it (e.g., blinding, batching, replication)? How you will assure validity of any measurement process (e.g. observer training, assaying blank, positive and negative lab controls) if you cannot cite a validation study?

Grouping (classification) Factor or Predictor (independent):
Potential Confounders:

What are the potential confounders (e.g., age, breed, reproductive cycle, maturity, comorbidity, ...) that could weaken your findings or invalidate your conclusions and how you will minimize their potential effect in your experimental design (e.g., matching, randomization)?

Statistical Analysis – ‘How will you account for random error?’

State method for recording, validating, and storing data (e.g., Excel spreadsheet).

In one or two concise sentences, state the statistical analysis method (e.g., paired t-test, logistic regression, repeated measures ANOVA) for your outcome variable(s), the basic steps you will use to fit your model to your data, your significance level, how you will test for method assumption violations, your alternative plan if you find violations, and the software package procedure (e.g., R glmer, SAS PROC MIXED) that you will use. For examples, look for such statements at the end of the Materials and Methods in strong primary papers.

You want reviewers to conclude that you know what you are doing and will use appropriate methods correctly.

Sample Size - ‘How many are just enough?’

State the minimum clinically, biologically or economically important difference that you intend to detect and the alpha and power level you used. Provide the standard deviation of this variable and the estimate source (pilot study, reference, estimate based on range, ...). State your sample size estimate and the formula, graph or table citation or sample size software (e.g., G*Power 3.1) you used to derive it.

You want the reviewer to conclude that you have established the minimum number of animals correctly, neither exposing too many unnecessarily nor wasting their contribution by using too few (lack of power).

Study Subject Eligibility & Acquisition - ‘How will you find enough of them?’

Provide any specific eligibility, inclusion and exclusion criteria (e.g., age range, breeds, prior history, condition severity range, previous treatment). If subjects are recruited from a patient population, the recruiting sources and methods for identifying (e.g., WSVMA newsletter announcement, referring DVM’s, hospital or laboratory records, diagnostic lab submissions, necropsy materials) and the expected eligible recruitment rate, the source of this estimate (e.g., VTH records) and total time frame.

You want the reviewer to conclude that you will easily acquire sufficient subjects within your allotted time.

Potential Pitfalls: ‘What is likely to go wrong and what will you do if it does?’

Acknowledge potential pitfalls (every study has them, reviewers know them!), how you plan to avoid them and provide an alternative plan that you will pivot to should a major one occur anyway.

You want the reviewer to conclude that you have considered all the pitfalls that might occur, your plan if a likely one occurs and that you are unlikely to waste time, money and experimental subjects because of it occurring.

Initial Budget (per subject or experimental unit): ‘Is what you propose feasible with these funds?’

Estimate per subject cost of acquiring and holding, supplies, laboratory costs per sample and totals with research fees and approved discounts if applicable.

You want the reviewer to conclude that this amount is a wise investment on their part and isn’t padded up or too low, both of which are a waste of scarce funds that other investigators could use.

(Time budget: Estimate your time per subject for animal procedures, imaging, acquiring and processing specimens. Estimate the time required to get any training you need, to acquire enough subjects, for any required healing to occur, and so on. Do you have sufficient time to pull this off?)

Initial References: ‘What published empirical evidence foundation are you building upon?’

Cite those key primary refereed scientific papers reporting 1) findings justifying your proposal as a next step, 2) key but non-standard lab methods or clinical procedures you will use, 3) validation of any scoring system (e.g., pain assessment, body condition score, tumor grade) you will use, 4) a well done data analysis applicable to the data you will generate, or 5) a similar well designed and executed study that you can mimic. Cite them in the grant reference format!

Key Collaborators: ‘Are you working with anyone who knows what they are doing?’

Experts other than your VCS mentor who have agreed to contribute critical expertise that you don’t have (e.g., histologists, radiologists, surgeons, statisticians) to your project, particularly those in service units charging fees for those services from whom biosketches will likely be required and who will likely be co-authors.