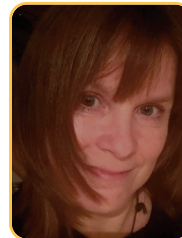


# Making the most of research 1: is the research relevant?

Two tools are introduced to assist the non-researcher to find and critically appraise research evidence published in academic journals. The first tool is the PICO framework, with which a precise, answerable, clinical question can be articulated, to help identify the most relevant studies. The second is a hierarchy of evidence, as presented by the Centre for Evidence-Based Medicine at the University of Oxford, UK. This hierarchy can help the reader assess which type of studies provide the most trustworthy evidence to aid decision-making.



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The aim of this short series is to offer practical advice on how to:

- focus your search on papers that are most relevant to your needs;
- navigate a paper efficiently to locate the information you are looking for;
- critically assess the quality of the information in terms of validity and trustworthiness; and
- position the information in the broader context of your clinical practice.

## Assessing relevance

This article provides some tips on how to assess the relevance of a paper and understand what type of evidence is being presented.

### How to focus your search by using a clearly articulated clinical question

Consider the scenario in which a client has asked whether a plug-in pheromone diffuser might help her cat that is urinating in the home. When looking for research evidence to support your response, a clearly-articulated clinical question will help to narrow the field of search efficiently. Consideration of each element in the **PICO** framework<sup>1</sup> can aid with clarification of the question:

This article is the first in a three-part series. The second article will look more closely at how to assess the quality of the research. The final part will look at putting research into practice.

- **P:** this refers to the **patient** (or **problem**) being addressed. We can refine our patient definition with biological, environmental, behavioural and pathological characteristics. For example, the cat might be an adult, neutered male, spraying urine vertically

inside the home, and showing nothing abnormal in urinalysis and imaging. So we might search for studies that relate to marking behaviour in male, neutered cats.<sup>2</sup>

- **I:** refers to the **intervention** considered. In this case, it is a synthetic analogue of the feline pheromone complex, delivered via a plug-in diffuser.
- **C:** refers to the **comparison** or alternative to the intervention. We might be considering the benefits and risks vs treatment with anxiolytic medication, or no treatment at all.
- **O:** is the **outcome** of interest. The goal could be the reduction or cessation of spraying in the home,<sup>3</sup> which could be measured by frequency of sprays per day.

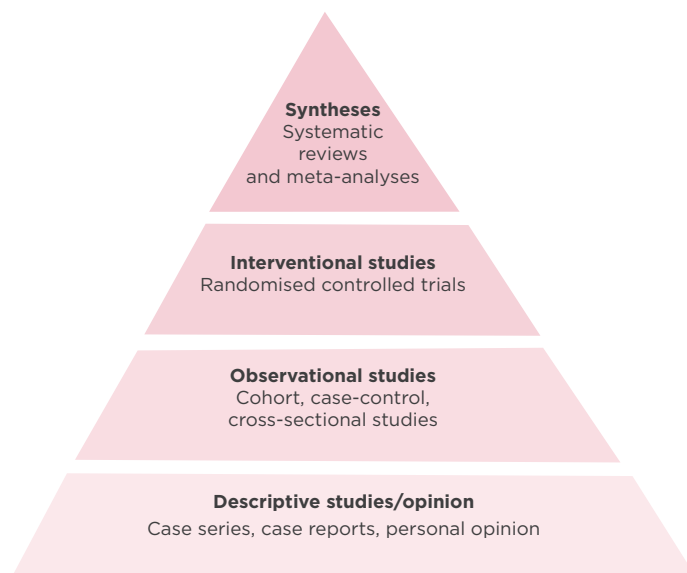
### Tip

PICO is one example of several frameworks that help frame different types of clinical questions. For further reading see Davies.<sup>4</sup>



### How to evaluate if the paper is a trustworthy source of evidence

Having found a paper, a useful next step is to consider what 'level' of evidence is being presented. It is widely, although not universally accepted<sup>5</sup> that some sources of evidence are more trustworthy than others.<sup>6</sup> A simplified hierarchy is shown in Figure 1. This hierarchy is driven largely by how well different sources of evidence can limit bias, with personal opinion considered the lowest level, and secondary syntheses of primary studies the highest, all other things being



**Figure 1:** A simplified hierarchy of evidence, adapted from Greenhalgh<sup>7</sup> and Dean<sup>8</sup> showing more trustworthy sources of evidence higher up the pyramid than less trustworthy sources. For a far more detailed hierarchy, the reader is referred to the Centre for Evidence-Based Medicine website<sup>6</sup>

equal.<sup>7</sup> In practice, a high-quality observational study may be a more reliable source than a flawed intervention study.

### Levels of evidence

#### Systematic reviews and meta-analyses

Systematic reviews employ explicit search criteria to identify papers for inclusion and may therefore be more objective than narrative reviews, in which the author subjectively chooses the papers.<sup>7,8</sup> In practice, objectivity also depends on the selection criteria chosen and their respective definitions. These criteria are documented in the methods section of the paper, as are the databases searched, the depth of search, and the filtering criteria (eg, for final inclusion in any statistical analysis). Detailed documentation facilitates replication, which adds accountability. For an example of a systematic review with meta-analysis on the topic of urine spraying, see the study by Mills et

al.<sup>3</sup> The reviewers synthesised data from published clinical trials that evaluated treatments for feline urine spraying. They reviewed 20 original studies, including four randomised clinical trials.

### **Intervention studies**

Controlled trials compare the outcome of a treatment group to that of a 'control' group. The control group receives an alternative or no treatment. Ideally, the two (or more) groups compared should be identical except for their treatment exposure, which allows the researcher to attribute differences in effect to the interventions tested.

In a randomised clinical trial, participants are allocated to the treatment or control group using a purely random process, to limit any bias in group allocation. In a double 'masked' or 'blinded' study, neither the researchers nor the cats' owners know to which group cats have been allocated. Hence, researchers limit bias that could be caused by subjective reporting by owners or their own subjective analysis.<sup>7,8</sup> For example, Hart et al<sup>9</sup> compared the effect on urine spraying of long-term treatment with fluoxetine vs clomipramine, randomly allocating cats to either one or the other treatment, with neither the researchers nor the owners knowing which treatment the cat received.

### **Observational studies**

Observational studies are undertaken when there is no experimental intervention or when it is difficult to control an intervention.<sup>7,8</sup>

In an observational study of feline scent-marking, Feldman<sup>10</sup> observed a population of semi-feral cats and measured their frequency and location of urine spraying over time.

Measures were compared between subgroups of the population, such as males and females, and across time periods, such as within or outside of the mating period. When appraising observational studies, claims of cause and effect should be interrogated with a critical eye. Differences between groups can be caused by confounding variables — those not measured or measured but not 'controlled' for, in statistical analysis.<sup>7</sup> For example, spraying frequency might change during the mating season, but this could be due to correlated changes in the weather.

Observational studies include cohort studies such as the Feldman study; case-control studies in which cats are included as cases if they have a disease or controls if they do not have disease; and cross-sectional studies, in which a population of interest is profiled at a point in time.<sup>8</sup>

### **Descriptive studies/opinion**

The findings of a case series or case report cannot be generalised beyond the specific cat studied.<sup>8</sup> However, case studies are useful for hypothesis generation and when more robust evidence does not exist. Schwartz<sup>11</sup> described a case where urine spraying in a male neutered cat was controlled by administration of cyproheptadine, which lowered serum levels of testosterone that were believed to be high due to remnants of testicular tissue after castration.

## **Conclusions**

As a starting point, the above guidelines can help evaluate whether a paper is relevant and a good source of evidence for clinical decision-making. In the next article, we will examine how to assess the quality of the specific study.

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## Online how-to videos

what all cats would want their owners to watch



International Cat Care has produced 16 short videos to demonstrate correct cat care and help owners with various cat care issues.

### General

- Apply a spot-on product
- Apply ear drops and clean your cat's ears
- Apply eye drops or ointment
- Brush your cat's teeth
- Clip your cat's claws
- Fit a collar for your cat
- Give subcutaneous fluids to your cat

### Giving a cat a tablet

- Two people giving a tablet
- Using a pill popper
- Hiding a tablet in a treat
- Crushing a tablet and mixing with water
- Crushing a tablet and mixing with wet food

### Diabetes

- Home blood glucose testing for your cat
- Collect your cat's urine
- Give your cat an insulin injection
- Test your cat's urine for substances like glucose and ketones

Available from  
[www.youtube.com/icatcare](http://www.youtube.com/icatcare)



International Cat Care is the parent charity of the International Society of Feline Medicine (ISFM). Find out more about International Cat Care at [www.icatcare.org](http://www.icatcare.org).