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# Guide aims

This guide is aimed at students preparing to search for information.

The guide will help you:

* Formulate a research question from an initial idea or assignment title
* Structure your research question into format that you can use to plan a search strategy for internet or bibliographic databases

# Introduction

When you start your studies, you'll normally be given lists of things to read by your lecturers. These can take the form of bibliographies or reading lists, references within lecture notes or links within your course Moodle.

You will soon have to look beyond assigned reading and search for other information to broaden your subject knowledge and evidence current practice in your field.

You may already be familiar with internet search engines or more formal bibliographic databases, such as [PubMed](http://eleanor.lib.gla.ac.uk/search~S6/y?search=pubmed&SORT=D) or [Scopus](http://eleanor.lib.gla.ac.uk/search~S6/y?search=scopus&SORT=D). You might also interview an expert, watch a video or attend a lecture or workshop. All are valid sources of information that could be cited within your work.

# Defining a research question



Thabane, L., Thomas, T., Ye, C. et al., 2009. Posing the research question: not so simple. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*, 56(1), pp.71-79. <https://doi.org/10.1007/s12630-008-9007-4>.

* Read through the sections ‘How to identify a research question’ and ‘The risks of a poorly formulated research question’.

Stone, P. 2002. Deciding upon and refining a research question. *Palliative Medicine*, 16(3), pp.265-267. <https://doi.org/10.1191/0269216302pm562xx>.

* Read the introduction and the section ‘Why is it important to have a clearly defined research question?’

Both articles are written for clinical research, but the principle of providing clarity of thought is common across all well-written research questions. This clarity also helps you to stay ‘on-topic’ when structuring your writing.

Whilst protocols and research methods may only concern students undertaking primary research, an awareness of how a research question is used to guide methodology will aid your understanding of how research is conducted in your field of study.

# Qualitative and mixed-methods

For those interested in qualitative and mixed-methods research, the following article by Alan Bryman might be of interest. As the title of the article suggests, the extent to which a research question influences research methodology can be questioned.

Bryman, A. 2007. The research question in social research: what is its role? *International Journal of Social Research Methodology*, 10(1), pp.5-20. <https://doi-org.ezproxy.lib.gla.ac.uk/10.1080/13645570600655282>

# Formulating a research question

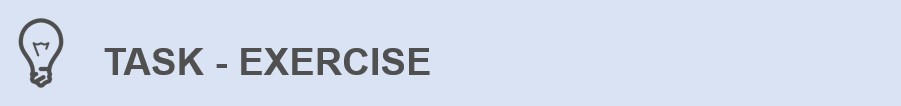
Let’s follow an example from a clinical scenario, to the formulation of a research question, to the structuring of a literature search.

The example is from a Knowledge Summary produced by the Royal College of Veterinary Surgeons. You can find the reference at the end of this resource, but don’t peek at the answers just yet!

The clinical scenario is given as, “You diagnose chronic kidney disease (CKD) in a 12-year-old cat. The owner asks whether they can do anything to help to reduce the risk of their younger, 6-year-old cat getting CKD in the future. They are particularly interested in whether different types of food might help to reduce the risk of the disease” (McLeonard, 2017).

Identifying the key elements of a scenario or question posed in an assignment is fundamental to formulating a well-structured research question and search strategy.

In this example, the key elements are adult cats, chronic kidney disease risk and food types.



How might you formulate a research question based on the clinical scenario?

The research question given by McLeonard (2017) is:

“Are adult cats fed on wet maintenance diets less at risk of developing chronic kidney disease (CKD) compared to adult cats fed on dry maintenance diets?”

You might have something different and that is absolutely fine – everyone will have a differing view on how to structure the question. As long you have identified the elements: adult cats, chronic kidney disease and food or diet in your research question, that is fine.

If this is a field of interest you might have identified the difference in feline diets: wet and dry maintenance diets. Additional subject knowledge and ‘reading around a subject’ is important to the formulation of a good research question. Searching for kidney disease rather than chronic kidney disease may well retrieve less relevant or irrelevant results. Similarly, searching for food or diet may not retrieve the full range of literature on the subject – a range of subject knowledge, synonyms and acronyms are needed to effectively retrieve the correct literature on a subject.

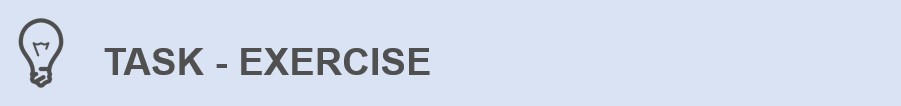
# Structuring a literature search

Once a research question has been formulated, the next step is to translate that question into a format that you can use to search across internet search engines and bibliographic databases.

Illustrated in the table below are several common tools for structuring a search; the method chosen depends on the research question. Some research questions will not fit these tools, if that is the case, simply search using the key elements of the question. Follow the doi links for more information on the tools.

|  |  |  |  |
| --- | --- | --- | --- |
| PICO  Used for: Evidence-based medicine  [http://dx.doi.org/10.7326/ACPJC-1995-123-3-A12](https://acpjc.acponline.org/Content/123/3/issue/ACPJC-1995-123-3-A12.htm) | SPICE  Used for: Evaluating projects or interventions  <http://dx.doi.org/10.1108/07378830610692127> | SPIDER  Used for: Qualitative or mixed methods  <http://dx.doi.org/10.1177/1049732312452938> | ECLIPSE  Used for: Evaluating services  <http://dx.doi.org/10.1046/j.1471-1842.2002.00378.x> |
| **P**opulation / problem | **S**etting | **S**ample | **E**xpectation |
| **I**ntervention / indicator | **P**erspective / population | **P**henomenon of **I**nterest | **C**lient group |
| **C**omparator / control | **I**ntervention | **D**esign | **L**ocation |
| **O**utcome | **C**omparison | **E**valuation | **I**mpact |
|  | **E**valuation | **R**esearch methodology / method | **P**rofessionals |
|  |  |  | **SE**rvice |

# PICO exercise



Return to our research question, “Are adult cats fed on wet maintenance diets less at risk of developing chronic kidney disease (CKD) compared to adult cats fed on dry maintenance diets?”, how would you structure this in a PICO format?

|  |  |
| --- | --- |
| PICO | Search concepts |
| **P**opulation / problem |  |
| **I**ntervention / indicator |  |
| **C**omparator / control |  |
| **O**utcome |  |

The below table illustrates McLeonard’s (2017) PICO. Don’t worry if you didn’t identify all (or any!) of the synonyms – this takes expert subject knowledge. Even then, the acronym ‘CKD’ was also not identified in McLeonard’s search, nor was the term ‘feed’ used, either that or they were not deemed necessary.

|  |  |
| --- | --- |
| PICO | Search concepts |
| **P**opulation / problem | cat OR cats OR feline OR felines OR queen OR tom |
| **P**opulation / problem | chronic renal failure OR chronic renal disease OR chronic renal insufficiency OR chronic kidney insufficiency OR chronic kidney failure OR chronic kidney disease |
| **I**ntervention / indicator | diet OR food OR maintenance diet OR maintenance diets |
| **C**omparator / control | - |
| **O**utcome | - |

This example highlights some limitations of the PICO tool for some research questions. We will discuss some of these limitations on the next section.

# Issues and limitations

As you can see in the previous example, PICO does not work for all research questions. We ended up with PPI, not PICO.

**My research question doesn’t fit PICO**. Some searches simply won’t fit PICO but, as with the previous example, they can still help structure a literature search.

**Why was dry/wet food not used as a intervention or comparator?** You may well have identified dry or wet food as a comparator in your PICO as this was defined in the research question. Translating this into a search would only retrieve literature with a direct comparison between dry and wet foods. This may retrieve a very small number of results, or no results at all. Combining dry and wet in the intervention means that we will retrieve literature on all food types – we can then compare the literature on whether dry food contributes to chronic kidney disease with the literature on whether wet food contributes to chronic kidney disease. Often no direct comparison is made between two interventions, so indirect comparisons have to be made.

# Searching for outcomes

**What about outcomes?** This is where we have to think ahead to how authors write about their research. It may be perfectly plausible to want to find literature on not developing chronic kidney disease, but authors do not regularly write about outcomes in their titles and abstracts, or an outcome may be a secondary outcome of a study and not deemed pertinent enough to record in the title or abstract.

The titles and abstracts are key. When we search for information, even on internet search engines, we are often only searching across partial information – usually just the title and abstract. This is almost always the case with bibliographic databases (such as PubMed). We therefore have to adapt our search to where we are looking for information – and this often means dropping elements of our PICO or research question in order to find information.

# Resource reference and methodology



Now you have followed the process of setting a research question through to adapting a question to a search strategy, read the Knowledge Summary on which this resource is based, in particular the question and clinical scenario and methodology section – see how the search is adapted to different databases.

McLeonard, C. 2017. Are adult cats fed on wet maintenance diets less at risk of developing chronic kidney disease compared to adult cats fed on dry maintenance diets? *Veterinary Evidence*, 2(4). <https://dx.doi.org/10.18849/ve.v2i4.130>

# Credits

#### Author credit

Paul Cannon, Information Services, University of Glasgow

#### Cover image

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