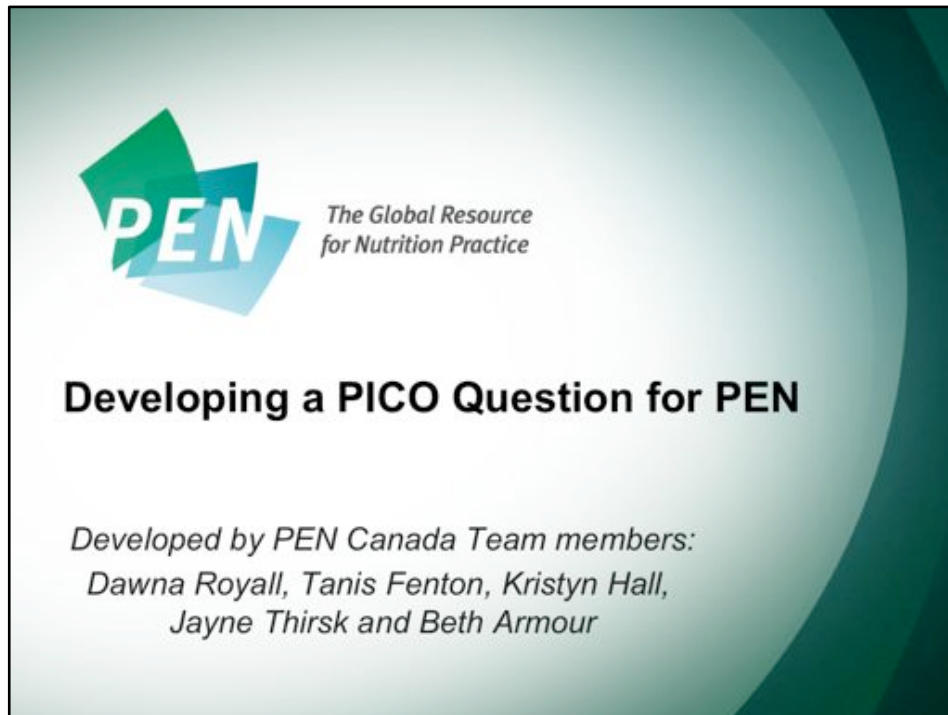Practice-based Evidence in Nutrition (PEN®, www.pennutrition.com) is the global resource for nutrition practice.

Developing a PICO Question for PEN

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This is one module in a series of modules on the evidence-based practice information cycle: Assess, Ask, Acquire, Appraise and Apply used in creating PEN content.

All modules have been developed by Dietitians of Canada from content of several presentations by the following members of the PEN team: Dawna Royall and Tanis Fenton who are evidence analysts for PEN; Kristyn Hall, PEN social media and former evidence analysts for PEN; Jayne Thirsk, Director of PEN and Beth Armour, PEN Content Manager
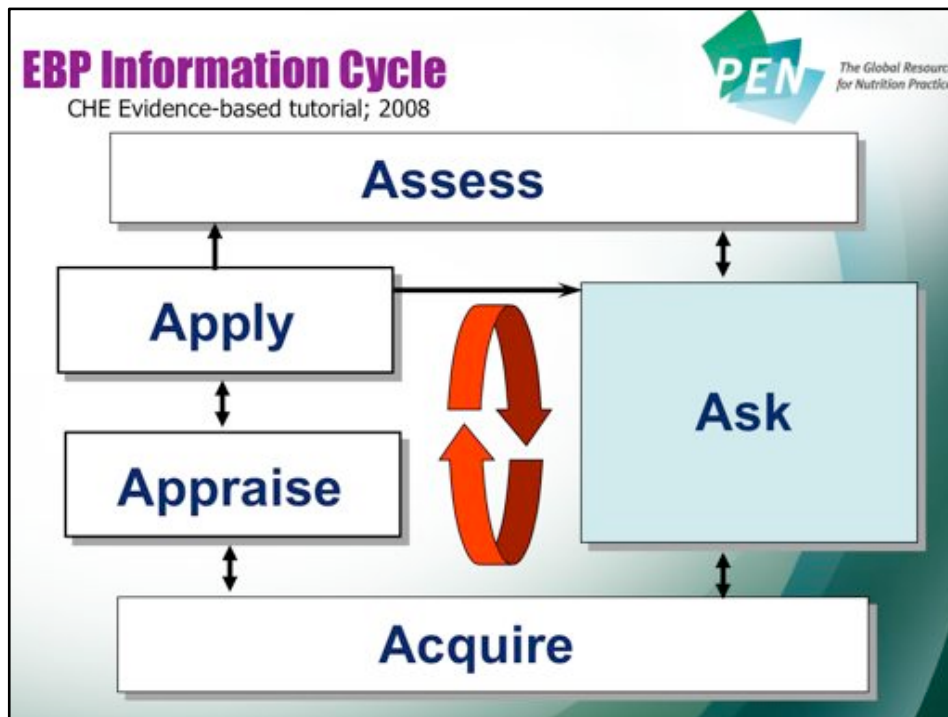
The second step after assessing, or sometimes the first step, in the evidence cycle of integrating evidence into practice is to convert the needs or question from practice into focused, structured, searchable questions.

With the volume of scientific literature today, the busy clinician doesn't have time to search through hundreds of articles to find an answer. The goal in asking clinical questions is to be able to find good quality, relevant research efficiently that will lead to sound evidence-based answers to resolve clinical problems and improve patient outcomes. One key to efficiency is asking a focused question.

*Ask* – frame the kinds of information you have identified in Step 1 or the ASSESS stage into searchable questions. Taking time to develop a "good" question will help you define what to look for and where to look.

There are two types of questions – *background* questions and *foreground* questions. **Background** questions are often of a general nature and relate to a condition for clinical topics or are about basic facts, descriptive stats or regulatory issues etc for non-clinical issues. Questions that pertain to a description of a disease, its etiology, prevalence, incidence, course etc. would be background questions. These are often questions asked by new learners. Answers can usually be found in various resources and textbooks, online sources such as the Merck Manual and MedlinePlus Encyclopedia and even narrative reviews and some original research studies depending on the topic. The PEN® Background documents, not surprisingly, house most of our Background questions. We did this deliberately to make it easier to find information… you don't have to wade through background to get to foreground questions… or vice versa

***This training module focuses on developing Foreground questions***

**Foreground** questions generally relate to more specialized knowledge which address issues of care, or decision making. Foreground questions usually ask about treatment, prevention, prognosis or diagnosis. These are questions more often asked by experts to address clinical or policy problems. We will be focusing on asking and finding answers to to *foreground* questions.

**Background or Foreground Questions?**

1. How long does it take 'food' to enter breast milk and be eliminated from it?

2. Does a breastfeeding mother's diet contribute to infant colic?

So, is the first question foreground or background? (Answer: background – general knowledge)

The second? (Answer: foreground – specific knowledge)

Here are some credible online sources to answer background questions.
■eMedicine (Medscape) http://emedicine.medscape.com/
■Mayo Clinic http://www.mayoclinic.com/
■Merck Manual Online
http://http://www.merckmanuals.com/professional/index.html
■Medline Plus Health Topics (NLM and NIH)
http://www.nlm.nih.gov/medlineplus/healthtopics.html
■NIDDK http://www2.niddk.nih.gov/

The PEN® Writer's Guide (http://www.pennutrition.com/WriterGuide.aspx) contains a more complete list and you all likely have your favourites.
Any favourites you don't see here you can submit them to us via "Contact Us" in PEN® and we could certainly add them to the list in the PEN® Writer's Guide.

**PICO Questions**

**Population** – how would you define your population e.g. demographics, medical condition?

**Intervention or Exposure of interest** – what are the intervention or prognostic factors?

**Comparison** – is there an alternative or standard practice to compare to? What comparison is relevant?

**Outcome** – what do you hope to accomplish, improve or effect? What outcome is important to you and your patients/clients?

Use the PICO or PECO format to formulate a searchable question…

**Your PICO terms form your research question**

Examples:

◆ Among hospitalized patients, do dietetic services improve quality of life or mortality?

◆ Among patients with dysphagia, what is the evidence that modified consistency improves swallowing?

These are two simple examples that could be developed further to narrow your search…

## PICO Research Question (example)

◆ Among hospitalized patients, do dietetic services improve quality of life or mortality?

- ➢ P
- ➢ I
- ➢ C
- ➢ O

Give it a try.

**PICO Research Question (example)**

◆ Among hospitalized patients, do dietetic services improve quality of life or mortality?

➢ P – adults hospitalized for bariatric surgery
➢ I – post-op bariatric surgery diet progression
➢ C – those post-op bariatric surgery who are allowed to eat ad-lib
➢ O – better quality of life and less incidence of vomiting

Here is one possible scenario. It is easy to see how the original question is far too broad and needs focus to have a successful search.

## PICO Research Question (example)

◆ Among patients with dysphagia, what is the evidence that modified consistency improves swallowing?
  ➢ P
  ➢ I
  ➢ C
  ➢ O

This original question was not so broad but can be further focused – give it a try.

**PICO Research Question (example)**

◆ Among patients with dysphagia, what is the evidence that modified consistency improves swallowing?

  ➢ P – adults with long-term dysphagia
  ➢ I – consuming modified consistency liquid and solid foods
  ➢ C – consuming regular consistency foods and liquids
  ➢ O – fewer incidences of chocking, weight maintenance

More focus will narrow your search results. Depending on the topic if there isn't much literature available sometimes we have to go back and broaden the question.

PICO questions can be further refined based on their type of inquiry.

Most inquiries about nutrition evidence are regarding the etiology or the causes of diseases or about optimizing health via nutrition. Examples of etiology questions could include: does vitamin A deficiency cause night blindness?, is serum cholesterol associated with heart disease?

The majority of these etiology studies are observational, in which the investigators looked for associations between food or nutrient intakes and the occurrence of a disease, to describe the potential etiology of the disease. These studies usually describe the direction and strength of association of a particular exposure with a particular outcome. Examples of observational studies include cohort, cross-sectional, and case-control studies.

In comparison, some studies include an intervention, to test a particular treatment or intervention strategy for effectiveness and the potential to cause harm. The best of these intervention studies are randomized, referred to as randomized controlled trials, and they provide the most reliable form of evidence.

Ask

Map question
- **Prevention / Etiology**
  Soy and breast cancer prevention
  *Cohort studies*
- Treatment / Intervention
  Chromium picolinate and body weight
  *RCTs*

The reason you try to map your question is that certain study designs are better suited to certain kinds of questions.

For instance, a soy and breast cancer question is about prevention of cancer or the etiology of cancer… this is best answered by cohort study design or better yet a systematic review of cohort studies with consistent results

A chromium picolinate question would be about it's effect, if any, on weight loss… this is best answered by randomized controlled trials (RCT's) or a systematic review of RCT's with consistent results.

## Choosing the best study design to address your question

| Question type | Example | Study types | Appraisal issues |
|---|---|---|---|
| Etiology and risk factors | Are there known factors associated with increased risk? | Systematic review of cohort studies, cohort studies, case-control study | Groups only differ in the one exposure, control for confounding |
| Intervention | What are the outcomes of the intervention | Systematic review of RCTs, RCTs | Randomization, blinding, complete follow-up |

*Adapted from the NHMRC 2000b, The Endorsement Process for Evidence, Base Clinical Practice Guidelines, Dietitians Association of Australia 2006

This chart indicates the ideal study design for the most frequent question types we see used in nutrition studies. It also suggests what might be some of the appraisal issues for each.

**Prevention / Etiology**

Are _____ (P)
who have_____ (E)
compared with those without / low__ (C)
at _____ risk for _____ (O)

**Treatment / Intervention**

In _____ (P)
how does _____ (I)
compared with _____(C)
affect _____ (O)

You might have slightly different wording depending on whether your question relates to prevention or etiology of disease versus a treatment or intervention type question.  Different types of questions are best answered by different types of studies and we'll talk more about that in a moment.

Leave up while groups work on their questions

PICO Question
Prevention / Etiology

◆ Are _____(P)
◆ who have_____ (I)
◆ compared with those without / low___(C)
◆ at ____ risk for _____(O)

◆ Are post-menopausal women who have a high consumption of soy products, compared to those with a low intake, at decreased risk for developing breast cancer?

In nutrition observational studies, the comparison group is often a lower intake rather than a distinctly different exposure
SO our soy prevention question might look like this:
Are post-menopausal women who have a high consumption of soy products, compared to those with a low intake, at decreased risk for developing breast cancer?
You may want to define high and low intakes.

In PEN®, the question can be reworded to improve readability.  Sometimes we also need to broaden or narrow the scope of the question based on the evidence, and to provide  useful information to the reader.  This is how it ended up for PEN®  "What is the effect of soy on breast cancer prevention in humans?"
http://www.pennutrition.com/KnowledgePathway.aspx?
kpid=7700&pqcatid=144&pqid=8065

For our treatment question, our PICO question might be…
In overweight individual (may or may not specify BMI), how does a daily chromium picolinate supplement compared with no supplement affect ones ability to lose weight?

This is how it ended up for PEN® : "Are chromium picolinate supplements safe and effective for weight loss among overweight or obese adults?" http://www.pennutrition.com/KnowledgePathway.aspx?kpid=15325&pqcatid=146&pqid=18737

So you now that you have your questions defined in PICO format… the next step in the EBP information cycle… is Acquire

**PEN® Training Modules**

The following other PEN® Training Modules are available:
- Evidence-based Process
- Appraising the Literature
- PubMed Module
- Quick Review of Study Designs

More information on acquiring evidence can be found in the PEN® Evidence-based Process training module and the PEN® PubMed Module. These and the other PEN® Writer training modules can be accessed at: http://www.pennutrition.com/WriterGuide.aspx