

Evidence-Based Practice: What Is it, and Why Is it Important to Registered Dietitians?

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Suggested CDR Learning Codes: 1000, 1020, 9000, 9020, 9050, 9060, 9070: Level 2

Historically, medical practice has relied on tradition, authority and standard approaches to treatment.¹ Dietetics—like other allied health disciplines—was influenced by this medical model. For example, from early in the 20th century into the 1970s, dietitians frequently instructed patients with peptic ulcers to follow the Sippy diet of hourly milk-and-cream feedings. This diet, thought to heal peptic ulcers, was prescribed by a generation of physicians, although it was later found to be ineffective.² The grossly nutrient-deficient and monotonous Sippy diet was also associated with a higher incidence of myocardial infarction.³ Of course, peptic ulcers are now treated with drug therapy.

A paradigm shift in medical practice occurred in 1992 when a landmark article in *The Journal of the American Medical Association* called for teaching evidence-based medicine (EBM) in medical schools.¹

EBM relies less on traditional, authority-based medicine and more on the process of defining the clinical problem, searching for the best available evidence, critically appraising a study to determine its validity, and summarizing the evidence.¹

In 2000, the Evidence-Based Medicine Working Group, an international team of medical faculty and physicians formed to produce a series of user guides for *The Journal of the American Medical Association*, expanded the principles of EBM to include a patient's values and preferences.⁴ One example of considering a patient's wishes when determining nutritional care would be respecting that a patient with diabetes and a terminal disease may desire no further medical treatment. EBM, therefore, is "the integration of best research evidence with clinical expertise and patient values."⁵ In addition, the practice involves decision making in the care of individual patients.⁶

As EBM was embraced by other medical and allied health disciplines, including dietetics, the broader term "evidence-based practice" came into use.

The following four factors have contributed to the growth of evidence-based decision making⁷:

1. the rapid growth of clinical studies and medical literature;
2. the availability of high-quality systematic reviews;

3. advances in health information technology that allow the availability of evidence-based information at the point of care; and
4. the promise of evidence-based decision making to support both improved patient care and cost control.

For dietitians, implementing evidence-based practice has advantages beyond improving patient care. Connie Diekman, MEd, RD, LD, FAND, past president of the Academy of Nutrition and Dietetics (the Academy), underscores the importance of this practice in obtaining reimbursement for services. “I believe success in that area, obtaining reimbursement for RDs services, and the survival of our profession depends substantially on how well and how quickly we adopt the evidence-based approach to practice.”⁸

This continuing education course will present the following steps RDs can use to adopt an evidence-based practice:

1. express the information needed in an “answerable” format;
2. search for and retrieve the best evidence;
3. critically appraise the evidence;
4. apply the evidence to the clinical situation; and
5. improve evidence-based practice via self-reflection.

This course also discusses the types of information resources available, the various levels of evidence available to search, and how to develop effective strategies for that search.

Step 1: Express the Information Needed in an “Answerable” Format

The first step in your search for the best evidence is to define the information you seek by expressing your question in a way that can be used to effectively search the literature, referred to as an answerable format.

There are two types of clinical questions: background questions, which seek general knowledge to address a patient’s care, and foreground questions, which seek specific considerations relating to how to treat a particular patient.⁶ An example of a background question is “What patient characteristics are associated with an increased risk of type 2 diabetes?” A foreground question is “Does clinic attendance improve glycemic control in a middle-aged, African American woman with type 2 diabetes?”

Using the PICO format will help you develop answerable clinical questions.⁵ PICO stands for:

- **P**atient/Population (or problem)
- **I**ntervention
- **C**omparison
- **O**utcome

For example, the PICO format for the above foreground question would be as follows:

- **Patient:** middle-aged, African American woman with type 2 diabetes
- **Intervention:** clinic attendance
- **Comparison:** no clinic attendance
- **Outcome:** hemoglobin A1c levels

Step 2: Search for and Retrieve the Best Evidence

By expressing the desired information in the PICO format, you can formulate effective strategies to conduct literature searches. For example, in the above PICO-formatted statement, the following four search terms are identified: type 2 diabetes, clinic attendance, African American, and hemoglobin A1c.

Population characteristics, such as middle aged and female, can be added to a search by using the limits features of databases such as PubMed or the Cumulative Index to Nursing and Allied Health Literature (CINAHL). For example, the limits features in PubMed are located on the left side of the screen. To limit to middle aged and female, click on “Show Additional Filters.” Select the boxes for “ages” and “sex.” Click on “female.” Under age, click on “More” and select the box for “middle-aged, 45-64 years.” For more information on how to use the limits feature on the database you are searching, explore the “Help” section. To locate the best evidence, consider limiting the search to the following three characteristics:

- **Publication type:** Limit the search to publication types with higher levels of evidence, such as systematic reviews, meta-analyses, randomized controlled trials, and practice guidelines.
- **Date:** Since medical information can quickly become outdated, limit your search to the most recent evidence available.
- **Population characteristics:** Use the available limits features to match the patient or problem, such as age and gender.

Constructing search strategies in research databases is different from conducting Google searches. Research databases support the use of particular connector words, sometimes referred to as Boolean operators. The connector words used with research databases are “and,” “or,” and “not.”

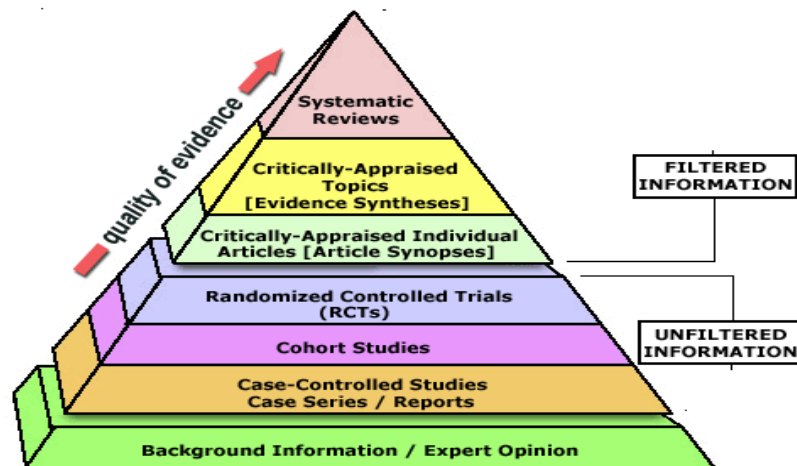
In the sample PICO-formatted question, the evidence being searched for includes the presence of all four search terms (type 2 diabetes, clinic attendance, African American, and hemoglobin A1c), which calls for the “and” connector: type 2 diabetes AND clinic attendance AND African Americans AND hemoglobin A1c.

Use the “or” connector when either search term is desired. It is frequently used when synonyms or additional terms for the same word are needed, for example: hemoglobin A1c OR glycosylated hemoglobin.

The “not” connector is used to exclude a term and can sometimes be helpful in eliminating irrelevant items, for example: type 2 diabetes—NOT type 1 diabetes. Be sure to use the “not” connector carefully, though, because it can exclude desired articles from a search. In our PICO scenario, for example, using the “not” connector would eliminate any articles that included both type 1 and type 2 diabetes because only type 1 diabetes was used as the “not” connector.

Filtered and Unfiltered Sources and Levels of Evidence

When searching for the best evidence, consider the following three characteristics to evaluate the clinical information resources you want to select: filtered sources, unfiltered sources, and levels of evidence. The Pyramid of Evidence-Based Clinical Practice Resources, below, shows the various types of clinical information resources and divides them into filtered and unfiltered resources.



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Filtered sources: At the top of the pyramid are filtered resources, including systematic reviews found in the Cochrane Library database. There are fewer filtered than unfiltered resources, but the former have been critically appraised and require less time to retrieve and evaluate. High-quality filtered resources, such as those found in the Academy’s Evidence Analysis Library (EAL) and in well-done current practice guidelines, are valuable for busy clinicians who do not always have time to search for the best evidence.

Unfiltered sources: At the bottom of the pyramid are unfiltered resources, such as research studies (randomized controlled trials, cohort studies, and case studies), that will be found when searching databases such as PubMed and the CINAHL. Background information also can be gleaned from medical textbooks and reliable medical websites, such as those for the American Diabetes Association and the FDA.

For unfiltered resources, the best research design is matched with the type of question being asked (diagnosis, treatment, prognosis, and etiology). For example, randomized controlled trials are considered the best research design for treatment questions.⁹ The Clinical Queries’ feature in PubMed allows users to search by specific study categories (diagnosis, treatment,

prognosis, and etiology) and retrieves the best type of research study for the type of clinical question being asked. It also allows users to limit searches to systematic reviews only.

Levels of evidence: The evidence-based practice glossary, below, provides definitions for various types of research studies. Systematic reviews, meta-analyses, and randomized controlled trials generally provide higher levels of evidence. Well-done current practice guidelines from reputable groups can also provide high levels of evidence.

Glossary for Evidence-Based Practice

Clinical practice guideline: a systematically developed statement designed to assist clinician and patient decisions about appropriate healthcare for specific clinical circumstances.

Meta-analysis: a systematic review that uses quantitative methods to synthesize and summarize the results.

Randomized control clinical trial: randomly allocates participants into an experimental group or a control group and follows them over time for the variables/outcomes of interest.

Systematic Review: a summary of the medical literature that uses explicit methods to perform a comprehensive literature search and critical appraisal of individual studies and which uses appropriate statistical techniques to combine these valid studies.

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Available Clinical Information Resources

Below are several examples of clinical information resources to aid in your search for literature on evidence-based practice, such as systematic reviews, evidence-based journals, and databases. Most of these resources require a paid subscription and can be accessed only through an academic or medical library. Many libraries make their resources available to on-site visitors. Some resources, as noted, are available free of charge from government agencies or professional organizations.

Systematic reviews: The Cochrane Library includes Cochrane Reviews and the Database of Abstracts of Reviews of Effects. PubMed Clinical Queries, which is free, also searches specifically for systematic reviews.

[Evidence Analysis Library \(EAL\)](#): Introduced in 2004, the Academy's EAL is available free to members, but nonmembers can purchase subscriptions. Academy members develop the content, which includes bibliographies, conclusion statements, and grades for the evidence, as well as summaries and specific information on the major findings, methodology and quality of each study. The EAL includes guidelines on many major nutrition-related diseases and conditions.

Practice guidelines: The National Guideline Clearinghouse is a free Web-based database of clinical guidelines from the federal Agency for Healthcare Research and Quality. Professional organizations also provide high-quality practice guidelines. For example, clinical practice recommendations on diabetes are published annually as a supplement to the January edition of *Diabetes Care* and are available free of charge from the [American Diabetes Association](#).

Evidence-Based Journals:

- **Evidence-Based Medicine** (published by *BMJ*) is available by subscription. It identifies key clinical articles and provides critical appraisals from more than 100 international medical journals. Selected content is provided free.
- **Evidence-Based Complementary and Alternative Medicine** is a free, open-access journal.
- **The Annals of Internal Medicine** includes critically appraised literature published each month by the American College of Physicians. This content is available as part of the journal subscription.

Research Databases:

- PubMed provides free access to the National Library of Medicine's Medline database and is the premier source of biomedical literature in the United States, with more than 21 million citations. Within PubMed, PubMed Central provides free access to 2.4 million full-text journal articles.
- CINAHL indexes journal articles from nursing, biomedical, consumer health, rehabilitation sciences, sports medicine, fitness, preventive medicine, and other allied health sciences. It's a subscription database and is available through many academic and medical libraries.
- PsycINFO is the major database for locating peer-reviewed literature in the behavioral sciences and mental health. PsycINFO is a subscription database and is available through many academic and medical libraries.

Other databases: Since nutrition is an interdisciplinary field, clinical questions might be best answered by searching other databases, such as the Natural Medicines Comprehensive Database or SPORTDiscus.

Point-of-care information products: These are defined as "electronic bedside information tools that provide summarized medical information for use by health care professionals."¹⁰ Point-of care electronic information products frequently are accessed through mobile devices including tablet computers and smartphones, and are used to help guide clinicians' decision-making. Examples include UpToDate, First Consult, ACP PIER, DynaMed, and Clinical Evidence.

The popularity of these products has risen dramatically. There are differences among them, and while many point-of-care products claim to be evidence based, the "evidence basis is not always transparent."¹⁰

Step 3: Critically Appraise the Evidence

According to a 2004 article in the *Journal of the American Dietetic Association*, “Evidence (research data) is graded on the basis of the type of research design, the rigor of the intervention used, and the strength of evidence (data) collected.”¹¹ Various systems for ranking or grading the quality of the evidence are also used in evidence-based practice.⁹ The Academy’s EAL uses a grading system to describe the strength of evidence.⁹ The grades, with condensed definitions, are as follows:

- **Grade I:** Good—These are high-quality studies that have consistent findings with generalizability of results.
- **Grade II:** Fair—These studies have a strong research design but may have minor methodological problems or inconsistencies in study results. There can be minor doubts about the generalizability of results.
- **Grade III:** Limited—These studies are weakly designed and have inconsistent results. There are serious doubts about the generalizability of the studies.
- **Grade IV:** Expert opinion only—Conclusions in these studies are based on expert opinion and have not been substantiated by research studies.

The more consistent evidence that you can find under Grades I and II, the more confident you can be in your results. However, when there is no Grade I or II evidence, you will have to use Grades III and IV evidence to help you draw the best available conclusion.

Step 4: Apply the Evidence to a Clinical Situation

After gathering evidence and having critically appraised it, you must decide whether—and how—to apply the evidence to your clients and their medical problems.

While it’s nice to find a recent, high-quality systematic review that exactly matches a patient’s condition, method of intervention, and desired outcome, this is rare. Instead, you likely will find a collection of results of differing levels of quality. As a result, you will most often have to utilize the evidence and incorporate your clinical judgment and the client’s values and wishes to make a determination of how to apply the evidence to the client’s diagnosis and/or treatment. Some questions to consider while going through this process include the following:¹²

- How closely do the findings resemble my patient and his or her problems?
- Is the intervention feasible for this patient?
- Is the intervention aligned with my patient’s values and wishes?

Step 5: Self-Reflection and Continued Improvement

A final step in the process is to self-reflect on the efficiency and effectiveness in completing the previous four steps so that the process is improved for the next patient. Examples of some questions to ask include the following.^{5,12}

- Were my clinical questions well formulated? (Were they in an answerable format?)

- Did I select the best sources for the type of clinical questions?
- Am I searching efficiently and are my searches improving?
- Am I critically appraising the evidence, and am I integrating that evidence into my practice?
- Do I have a system for becoming aware of “newly emerging evidence”? Consider using automatic alerting systems by setting up searches on the My NCBI feature of PubMed, monitoring the Table of Contents in relevant journals, and subscribing to RSS feeds such as those on Health Topics from MedlinePlus.

The Future of Evidence-Based Practice and Dietetics

The Health Information Technology for Economic and Clinical Health Act of 2009, more commonly known as the HITECH Act, calls for implementing electronic medical records by 2015. The goal is to create a nationwide health information network that allows standardized patient data to be shared among many healthcare professionals. With its rapid growth, electronic medical records will become increasingly powerful as EBM and clinical decision-support systems are incorporated into it.

Adopting the five steps of evidence-based practice into everyday practice has the potential to not only improve patient care but to empower dietitians. An article in the ***Journal of the American Dietetic Association*** notes that effective implementation of evidence-based practice “adds to the credibility and value of dietetics’ professionals.”¹³

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Learn More About Evidence-Based Practice

RDs can learn more about evidence-based practice from the following resources:

[Centre for Evidence-Based Medicine](#), part of the department of primary care health science at the University of Oxford in England, provides information and support to doctors and other healthcare professions on evidence-based practice.

[Evidence-Based Practice](#), from the University of Washington, links to sources of information on learning more about EBP.

[Evidence-Based Practice: Improving Patient Care](#), from the University of California at Irvine, is a tutorial that actively guides learners through the step-by-step evidence practice process.

[Find it Fast!](#), from the Harvey Cushing/John Hay Whitney Medical Library at Yale University, is a series of video tutorials on various evidence-based practice information resources.

[Introduction to Evidence-Based Practice](#) is a self-paced tutorial from Duke University Medical Center Library and the University of North Carolina at Chapel Hill Health Sciences Library.

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Examination

1. Which of the following factors has driven the need for evidence-based practice (EBP)?

- A. A resistance to the use of electronic medical records.
- B. The availability of high-quality systematic reviews
- C. The growing number of malpractice cases.

2. Evidence-based practice is defined as “the integration of best research evidence with clinical expertise and patient values” and involves decision making in the care of individual patients.

- A. True
- B. False

3. The first step in evidence-based practice is to search for a high-quality article.

- A. True
- B. False

4. When searching for evidence-based literature on the vitamin D requirements of adolescents, which of the following would be the best search strategy?

- A. Vitamin D AND (nutritional status OR nutrition policy) — limit to adolescent and publication type: systematic review, meta-analysis, randomized controlled trials, practice guidelines.
- B. Vitamin D OR nutritional status OR nutrition policy — limit to adolescent and publication type: systematic review, meta-analysis, randomized controlled trials, practice guidelines.
- C. Vitamin D AND nutritional status AND nutrition policy — limit to adolescent and publication type: systematic review, meta-analysis, randomized controlled trials, practice guidelines.
- D. (Vitamin D OR nutritional status) AND nutrition policy — limit to adolescent and publication type: systematic review, meta-analysis, randomized controlled trials, practice guidelines.

5. The acronym, PICO, stands for which of the following:

- A. Patient, Incidence, Comparison, Overview.
- B. Patient/Problem, Intervention, Comparison, Overview.
- C. Patient/Problem, Intervention, Comparison, Outcome.

6. Which type of research design is not considered a higher level of evidence?

- A. Review
- B. Randomized controlled trial
- C. Meta-analysis
- D. Systematic review

7. According to the Pyramid of Evidence-Based Clinical Practice Resources, filtered information products include which of the following?

- A. Systematic reviews
- B. Background information
- C. Randomized controlled trials
- D. Case reports

8. Point-of-care information products always provide the highest levels of evidence.

- A. True
- B. False

9. Which of the following statements relating to the Evidence Analysis Library from the Academy of Nutrition and Dietetics is true?

- A. It identifies key clinical articles and provides critical appraisals from more than 100 international medical journals.
- B. A grading system from Grade I to Grade VI is used to rank the quality of the evidence.
- C. Information on the methodology and quality of each study is included.
- D. The content is developed by members of the American Medical Association.

10. Which of the following statements about evidence-based practice is true?

- A. Studies given a grade III in strength of evidence are based solely on expert opinion.
- B. When employing evidence-based practice, it is not necessary for a practitioner to apply his or her own clinical judgment to a clinical situation.
- C. Considering the feasibility of the proposed intervention is not a part of the process.
- D. Developing a system for becoming aware of newly emerging evidence is important.