

Synthesize the Evidence to Answer Practice Questions

PEN System Content Overview

The PEN system is an evidence-based decision support resource developed by Dietitians of Canada. It is designed to help dietitians keep pace with food and nutrition research. The PEN system provides knowledge pathways on a variety of topics relevant to everyday practice, where PEN authors identify relevant literature from various sources, and then critically appraise, grade and synthesize that literature into key practice points to answer specific practice questions.

Practice Question Overview

PEN Practice Questions are developed and updated using the PEN System's [five step evidence-based process](#) to aid in clinical and other practice decision-making. Practice questions are generally formulated using the PICO approach (Population, Intervention, Comparison, Outcome) and aim to reflect the everyday practice situations faced by dietitians. Answers to Practice Questions provide detailed information on the science that informs the practice recommendation by synthesizing the literature and practice guidance.

Practice questions are organized into Knowledge Pathways. Knowledge Pathways are the nutrition topic areas in the following practice categories: Population Health/Lifestyle; Health Condition/Disease; Food/Nutrients; and Professional Practice. Knowledge pathways also include other knowledge products about a topic (e.g, Summary of Recommendations and Evidence, Toolkits, Related Tools & Resources).

RESOURCE | Learn more

- Visit [PEN Terminology and Features](#) to learn more about Knowledge Pathways, Practice Questions and more
- Watch a [quick video tutorial](#) on PEN's featured products and how to navigate the System

Practice Questions are further organized in the ADIME framework: Assessment, Intervention, Monitoring and Evaluation. Each response to a Practice Question is organized within a Key Practice Point (KPP). KPPs are a synthesis of evidence presented in a short, clear practice guidance statement or answers to specific questions. KPPs include a Recommendation, Evidence Summary, Evidence, and References. Additional details are provided in the Remarks, Comments, or Rationale sections.

RESOURCE | PEN Practice Question Examples

[Do adults and/or pediatric patients with cancer and neutropenia who consume a neutropenic diet compared to individuals who consume a non-neutropenic diet have better clinical outcomes \(e.g. fewer infections, fevers, morbidity, quality of life\)?](#)

[What are the short- and long-term physical and mental health effects of high added sugar consumption in children and adolescents \(≤18 years old\)?](#)

[Does the maternal consumption of nitrates during pregnancy \(including cured meats containing sodium nitrate\) increase health risks in infants and children?](#)

Assignment Learning Outcomes

1. Students are familiar with how the PEN evidence-process translates the best available nutrition into practice recommendations for dietitians and health care providers across practice settings.
2. Students apply critical thinking and skills in research appraisal, synthesis and written communication to develop/update a PEN-style practice Question(s) using an adapted PEN evidence-process.

Educators can follow these steps to create this assignment:

Pre-Assignment

Before beginning the assignments the following PEN resources should be considered to support student familiarity with research methods and searching and appraising the literature.

- [Research Methods Background](#)
- [Quick Review of Study Designs Module](#)
- [Asking the Question Module](#)
- [PEN PubMed tutorial](#)
- [Appraising the Literature Module](#)

Assignment

The PEN System's [five step evidence-based process](#) can be used to organize the student assignment. Educators can use these steps to create this assignment. A sample practice question rubric can be found in [Appendix A](#).

1. Selecting a Topic (Assess)

Practice questions are organized into Knowledge Pathways (nutrition topics) that span areas of practice. Students may select a topic area by browsing PEN's [Table of Contents](#) or focus their topic search to one of the following practice categories:

Population Health/Lifecycle

Focuses on healthy eating and active living issues with the perspective of promoting/maintaining health of the entire population and/or population groups.

Health Condition/Disease

Focuses on prevention, treatment or therapeutic interventions of specific illnesses with individuals or groups.

Food/Nutrients

Focuses on topics specific to food composition, preparation, food service systems, safety, regulations and new technologies.

Professional Practice

Focuses on professional development, education and skill enhancement.

Within the topic area (Knowledge Pathway), students can become familiar with the existing list of practice questions that are included in the Knowledge Pathway.

Knowledge Pathway and Practice Question Example

Diabetes - Continuous Subcutaneous Insulin Infusion

Practice Questions

Click on the Practice Question to view the synthesis of the literature and the practice guidance or recommendation.

Intervention

Q: Which insulin pump bolus type improves glycemic control for low glycemic index (GI) versus high GI meals?

Last Updated: 2022-06-01 **NEW**

Q: Which insulin pump bolus type improves glycemic control for high protein meals?

Last Updated: 2022-06-01 **NEW**

Q: Which insulin pump bolus type improves glycemic control for high fat meals?

Last Updated: 2022-06-01 **NEW**



2. Developing a Practice Question (Ask)

Based on the topic area, practice questions should be developed into focused, searchable questions.

It is important to frame the kinds of information you have identified in Step 1 into focused, searchable questions, using the [PICO question format](#). Practice questions should also aim to be current, relevant and consider the impact on the patient/client or practice. Read more about how the PEN team aims to [ask the right practice question](#) for the specific topic area, using a PICO format.

RESOURCE | Criteria for determining practice question relevance (Modified Splett Criteria*)

- Does the practice question substantially improve patient/client outcomes?
- Does the practice question affect a large or vulnerable client population?
- Does the practice question affect overall policy & administration?
- Does the practice question reduce health system costs?
- Does the practice question decrease practice uncertainty?

*Brauer PM. Practice guidelines: pedantic pontification or pragmatic progress? 2003 Ryley-Jeffs Memorial Lecture. Can J Diet Pract Res. 2003 Fall;64(3):142-6. doi: 10.3148/64.3.2003.142. PMID: 12959662. Abstract available from: <https://pubmed.ncbi.nlm.nih.gov/12959662/>

To help further refine the practice question, students may consider the different sub-category options:

Health Promotion / Prevention

Questions in this category relate to the efficacy of health promotion or disease prevention activities or interventions; content may define or illustrate population health approaches including capacity building social marketing, etc.

Assessment / Surveillance

Who should be assessed or screened, when, how, and why are the types of questions addressed here (they should be grounded in evidence and ideally tied to outcomes, not simply common or desirable practice).

Intervention

Questions relating to effective program planning as well as nutrition interventions or therapy would be addressed in this sub-category.

Monitoring/ Evaluation

Questions in this section might relate to cost effectiveness, best practices, evaluation strategies, outcomes of interventions or validity of particular outcome measures.

Education

Questions addressing effectiveness of specific types of education/counselling or education programming would be addressed in this sub-category.

3. Conducting a Search (Acquire)

Evidence used to answer the practice question is acquired using a hierarchical approach. Databases (e.g., PubMed) and when appropriate, grey literature are included to support the development of the nutrition recommendation in the practice question. Learn more about how the PEN team [acquires](#) the evidence, including conducting and documenting the search strategy.

The aim is to cast the ‘search net’ that will obtain relevant literature results. A search strategy that is too narrow will yield too few results. A search strategy that is too wide will yield too many results. Additional filters (i.e., selection criteria) like publication dates, language and study design will help to further refine the search yield.

RESOURCE | PEN System Search Strategy

- [Search Strategy Worksheet \[Appendix B\]](#)
- [Example of Practice Question Search Strategy](#)

4. Appraising the evidence (Appraise)

Appraisal involves taking the acquired information (identified in Step 3: [Acquire](#)) and critiquing it by systematically reviewing its strengths and weaknesses, as it relates to the reliability, validity and application to your specific question (identified in Step 2: [Ask](#)). Learn more about how the PEN team [appraises](#) the evidence used to address the practice question.

Appraised evidence is given a [Grade of Evidence](#) based on the quality of evidence.

- Grade A** • The conclusion is supported by good evidence
- Grade B** • The conclusion is supported by fair evidence
- Grade C** • The conclusion is supported by limited evidence or expert opinion
- Grade D** • A conclusion is either not possible or extremely limited because evidence is unavailable and/or poor quality and/or is contradictory

RESOURCE | Evidence Appraisal Tools

- [PEN Evidence Grading Checklist](#)

5. Writing the Practice Question (Apply)

Once the evidence has been acquired and appraised, the final step is to apply the evidence. This consists of summarizing the results of the evidence and integrating into the various sections of the practice question. Practice questions are organized into Key Practice Points (KPPs). KPPs are a synthesis of evidence presented in a short, clear practice guidance statement or answers to specific questions. KPPs include a Recommendation, Evidence Summary, Evidence and References. Additional details are provided in the Comments or Rationale sections. Learn more about how the PEN team [applies the evidence](#) into a practice question.

***NB:** The PEN System is global so practice questions will consider international recommendations from Australia and the United Kingdom. This may be omitted from the student assignment.

RESOURCE | Writing the practice question

- [PEN Quick Update Process](#)
- [PEN Practice Question Template](#) [[Appendix C](#)]
- [PEN Plagiarism Guidelines](#)

To approach writing the practice question, the following steps can be considered to address the key components of the question.

- **Key Practice Point**
- **Evidence** (Evidence Statements)
- **Evidence Summary**
- **Recommendation**
- **Remarks** (optional)



- [References](#)
- [Glossary](#) (optional)

The practice question can be written using the provided template ([Appendix C](#)).

1. Decide on the number of **Key Practice Point(s)** (KPP) needed to answer the practice question. This can also be only one KPP if this is sufficient to answer the practice question.
2. For each Key Practice Point(s), write the **Evidence** section which is composed of **Evidence Statements**. The Evidence Statements describes each study included to support the practice recommendation. Each evidence statement can be organized using a letter system (a, b, c) and should be reported as a separate statement.
3. Next, summarize the evidence by creating an **Evidence Summary** which is a succinct summary and critical appraisal of the Evidence section. Individual statements are graded using the [PEN Evidence Grading Checklist](#).
4. Once each component of the Key Practice Point is complete, consider the Evidence Summary to write the **Recommendation**. This is the 1-2 sentence take-home message (the “so what”) for practitioners.
5. If required, consider adding **Remarks** (optional). Remarks can include context for the topic that the author wishes to convey to the reader to better understand the application of the evidence. These are statements that do not belong in the Evidence Statements. The PEN team also includes **Comments** (relevant information to support the Key Practice Point) and **Rationale** (explanation of the proposed or known mechanisms of action, reasoning behind research hypotheses and explanations for theories) to support practice questions. Information supporting this section can be referenced along with the evidence used to inform the practice question recommendation.
6. **References** (in-text and reference list) can be formatted using [NLM Style](#).
7. As appropriate, definitions of key terminology used in the pathway that a dietitian may be unfamiliar with can be included in a **Glossary**.

RESOURCE | The PEN Team is here to help!

The [PEN team](#) can support this assignment to synthesize the evidence and answer a practice question in the following ways:

- Provide a list of PEN priority practice questions needing revision or developing.
- Act as a resource for the student / intern / educator.

Appendix A | Sample Practice Question Rubric

Category	8 points	6 points	4 points	2 points	Score
Practice Recommendation	<p>Practice recommendation is clear and easy to understand from a practitioner’s perspective.</p> <p>The recommendation answers the practice question.</p>	<p>Practice recommendation is missing some information. Additional clarity would improve a practitioner’s understanding.</p> <p>The practice recommendation answers the practice question somewhat.</p>	<p>Practice recommendation is missing some information. Additional clarity would improve a practitioner’s understanding.</p> <p>The practice recommendation does not clearly answer the practice question.</p>	<p>Practice recommendation is incomplete.</p>	
Evidence Summary	<p>Evidence summary is clear and sufficiently detailed to support the practice recommendation.</p> <p>The evidence is graded appropriately.</p>	<p>Evidence summary is clear but is lacking detail to support the practice recommendation</p> <p>The evidence is graded appropriately.</p>	<p>Evidence summary lacks clarity and requires more detail to support the practice recommendation.</p> <p>The evidence is not graded appropriately or missing.</p>	<p>Very little detail is provided in the evidence summary.</p> <p>The evidence grading is missing.</p>	

Category	8 points	6 points	4 points	2 points	Score
Evidence (Evidence Statements)	<p>There are Evidence Statements to describe each study included to support the practice recommendation. Each Evidence Statement is reported separately (a, b, c).</p> <p>Evidence statements are clear, provide sufficient detail, and are logically presented.</p>	<p>There are Evidence Statements to describe each study included to support the practice recommendation.</p> <p>Each Evidence Statement is reported separately (a, b, c) .</p> <p>Evidence statements are mostly clear, provide good detail, and are logically presented.</p>	<p>Evidence Statements are missing to support the practice recommendation.</p> <p>Evidence statements are lacking clarity, provide insufficient detail to support practice recommendation, and/or would benefit from more logical presentation.</p>	<p>Evidence Statements are missing to support the practice recommendation.</p> <p>Additional details are required to understand the logic in supporting the practice recommendation.</p>	
	4	3	2	1	
Formatting	<p>The formatting is neat, clear, and logical.</p> <p>Contains subheadings.</p>	<p>The formatting is neat, but lacks clarity and logic.</p> <p>Contains some subheadings.</p>	<p>The formatting would benefit from more work.</p> <p>Minimal use of subheadings.</p>	<p>The attention to formatting is missing, lacking logic and clarity.</p> <p>No subheadings.</p>	

Category	8 points	6 points	4 points	2 points	Score
Grammar and Spelling	There are no grammatical or spelling errors.	There is 1-2 grammatical or spelling errors.	There are 2-3 grammatical or spelling errors.	There are more than 3 or more grammatical or spelling errors.	
Accurate Referencing	Referencing (in-text and reference list) is provided for all evidence statements and remarks/rationale /comments (as appropriate). There are no reference formatting errors.	Referencing (in-text and reference list) is provided for all evidence statements and remarks/ rationale/ comments (as appropriate). There are few formatting errors.	Referencing (in-text and reference list) is provided for some evidence statements and remarks /rationale/ comments (as appropriate). There are several formatting errors.	Referencing is missing in/text or reference list.	
Total	/36	/27	/18	/9	/90



Appendix B | Search Strategy Worksheet

Practice Question:

SEARCH TERMS

MeSH Terms

Text words

Databases and Grey Literature Sources (e.g. international guidelines) Searched

Reasons for excluding reviews or studies identified using a hierarchical literature search DATE

Search Completed:

Search Limits (e.g. date, language):

Appendix C | Practice Question Template

PEN Knowledge Pathway:

Search strategy

(end of document or Appendix)

Key Practice Point #1

Recommendation

(1-2 sentence take-home message)

Evidence Summary

(Concise summary of evidence points described in the Evidence section, below. Include evidence grades)

Grade of Evidence

(List of all evidence grades used in the evidence summary)

Remarks

(Contextual information helpful in understanding and applying the recommendation)

Evidence

(Each lettered point is typically a separate study. Studies are usually ordered by first by type [secondary primary grey literature], then publication date [newest to oldest])

a.

b.

c.

Comments (Optional)

(Additional information relevant to the key practice point)

Rationale (Optional)

(Explanation for mechanisms of action / research hypotheses / theories)



References

- 1.
- 2.
- 3.

Glossary (Optional)