

Guide to Designing Meaningful Clinical Scenario Questions for eLearning

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See interactive examples, download this guide and a clinical scenario writing template at: <https://www.desouzainstitute.com/chpca-conference-2021/>

At the de Souza Institute, we are often asked to design non-facilitated or “self-directed” eLearning courses, where there is no active instructor to give learners feedback. In eLearning courses, learners need opportunities to **practice applying new knowledge**, but designing **feedback on learning** is often overlooked in **self-directed** courses. This guide looks at how you can use *Clinical Scenario Questions* in eLearning to allow learners to correct errors and reinforce correct decision-making without the aid of an active instructor.

What are *Clinical Scenario Questions* in eLearning?

Clinical scenario questions are multiple-choice questions that present an **authentic clinical task or problem**, and then ask the learners to actively **make decisions to respond in a clinically-realistic way**. After choosing their response, learners are provided with **immediate and meaningful feedback** that is based on the learner’s specific response. With effectively designed feedback, learners are more able to see the consequences of their simulated clinical choices and revise their choices based on the consequences presented.

To begin designing a Clinical Scenario Question, first pick a key decision-point in care (e.g., screening, diagnosis, treatment) or a key decision-point in a conversation that would have clinical outcomes (e.g., patient education, therapeutic communication, talking to a family member). Ensure that your decision-point is reflective of one of your course’s learning objectives and that the decision can be informed by the evidence-based practice that is taught in your course.

Anatomy of a Clinical Scenario Question

STEM	Clinical Vignette	Mrs. Glass is a 74-year-old woman living with heart failure and advanced dementia. Today, you are visiting Mrs. Glass at her home for routine symptom management. Her daughter says her mom is "different" today. She is more restless, is resisting care, and was moaning and refusing food. You wonder if Mrs. Glass is in pain.
	Lead-in	What tool or strategy would you use to assess Mrs. Glass for pain?
OPTIONS	Distractors	<input checked="" type="radio"/> a) Assess for pain using the Visual Analog Scale (VAS). <input type="radio"/> b) Assess for pain using the OPQRSTUV framework. <input type="radio"/> c) Assess for pain based on the daughter's observations.
	Correct answer	<input type="radio"/> d) Assess for pain using the PAINAD tool.
FEEDBACK	Choice	Choice A: You ask Mrs. Glass to "Mark a point on the line that describes your pain. This side of the line means no pain and this side means the worst pain you've had." You point to the line on a sheet of paper.
	Clinical Outcome	Outcome: Mrs. Glass is moaning and very restless. She pushes the VAS paper away from her.
	Rationale	Why did this happen? The VAS is a useful pain severity scale for patients unable to complete longer, multidimensional pain assessment tools. However, Mrs. Glass is living with very advanced dementia, so a more appropriate strategy would be to focus on observing pain behaviours.
	Next Steps	<i>This was not the ideal outcome. Go back and try a different approach.</i>

Components:

- Stem:
 - Clinical Vignette
 - Question / Lead-in
- Options:
 - One Correct response
 - 2-4 incorrect "distractors"
- Feedback:
 - Choice
 - Clinical outcome
 - Rationale
 - Next steps

How to Design a Question Stem

STEM	Clinical Vignette	Mrs. Glass is a 74-year-old woman living with heart failure and advanced dementia. Today, you are visiting Mrs. Glass at her home for routine symptom management. Her daughter says her mom is "different" today. She is more restless, is resisting care, and was moaning and refusing food. You wonder if Mrs. Glass is in pain.
	Lead-in	What tool or strategy would you use to assess Mrs. Glass for pain?

The “stem” consists of a “clinical vignette” and a “lead-in”. The **Clinical Vignette** is a “short description of a clinical scenario or a clinically important patient presentation” including all the information the learner will need to make a clinical decision (Medical Council of Canada, 2010).

The clinical vignette can include the following information (Medical Council of Canada, 2010; NBME, 2020):

1. Age, Gender (e.g., a 65-year-old woman)
2. Site of Care (e.g., admitted to hospital)
3. Presenting Complaint (e.g., because of intermittent confusion)
4. Duration (e.g., that has lasted for 24 hours)
5. Patient History (e.g., with a history of breast cancer)
6. Physical Findings
7. Results of Diagnostic Studies
8. Initial Treatment, Subsequent Findings, etc.

Not every item above will be included in each vignette, though it is recommended that the items be included in the order above (Medical Council of Canada, 2010; NBME, 2020).

We often use **second-person** for the case to put the learner in the position of making a decision, e.g., “Today, **you are visiting** Mrs. Glass at her home for routine pain and symptom management...”

The **Question** or *Lead-in* is the last sentence of the scenario and should mimic a clinical decision as closely as possible.

- ✓ The lead-in must be clear and concise and ask the learner to make **one decision** or take **one action**. Do not ask multiple things in one question. For example, “How would you assess and manage this symptom?” is not an appropriate example of a lead-in, because it asks two questions.

- ✓ Ensure that the lead-in is asking for **application of knowledge** to the case, rather than simple recall of facts (NBME, 2020).
- ✓ Avoid adding **irrelevant difficulty**, such as adding content to the clinical vignette that is not needed to answer the question (NBME, 2020).

How to Design the Question Options

OPTIONS	Distractors	<input checked="" type="radio"/> a) Assess for pain using the Visual Analog Scale (VAS).
		<input type="radio"/> b) Assess for pain using the OPQRSTUV framework.
		<input type="radio"/> c) Assess for pain based on the daughter's observations.
	Correct answer	<input type="radio"/> d) Assess for pain using the PAINAD tool.

The **correct option** should be a decision informed by the evidence-based practice covered in your course (e.g., *practice guidelines, frameworks, basic science concepts, research studies, drug monographs*).

The **incorrect** or **“less ideal”** choices (also known as **“distractors”**) should be realistic choices that a trainee might make. The distractors should include common errors and no obviously unrealistic actions. To compose effective distractors:

- Think about common mistakes/errors that you’ve seen new trainees make.
- Ask other educators/supervisors about what common mistakes they’ve seen when training new staff.
- Conduct a literature search for published articles detailing common mistakes that new trainees make in your clinical field/profession.

Ideally, use the **“single-best-answer”** question-type and try to **avoid the “select-all-that-apply”** question-type (Medical Council of Canada, 2010; NBME, 2020).

The *single-best-answer* question-type is better at assessing learners “judgment, synthesis, and application of knowledge” without adding irrelevant difficulty (NBME, 2020). For a detailed explanation as to why you should avoid the *select-all-that-apply* question-type see:

- Medical Council of Canada. (2010). *Guidelines for the Development of Multiple-Choice Questions*. Retrieved from <https://mcc.ca/media/Multiple-choice-question-guidelines.pdf>
- National Board of Medical Examiners (NBME). (2020). *NBME Item-writing Guide - Constructing Written Test Questions for the Health Sciences*. Retrieved from <https://www.nbme.org/item-writing-guide>

Tips for Designing Clinical Scenario Options

- ✓ Ideally, each option is a single concise decision or action (NBME, 2020).
- ✓ Each option should be a **realistic** clinical action that a new trainee might perform.
- ✓ The distractors do not have to be *completely* wrong. Distractors are only less correct than the “correct” option, and keeping this in mind will help you design more realistic distractors. (NBME, 2020).
- ✓ Avoid adding in **irrelevant difficulty** (NBME, 2020):
 - Avoid overly lengthy options, for example, those that are more than 2-3 lines long. If you find that your options are becoming too long, ask yourself:
 - *Can any content be moved* into the clinical vignette? Do not include additional information about the case in the options. All the case information should be in the vignette.
 - Do the options contain *more than one decision/action*? If the options contain more than one decision/action, *can the question be divided* into two or more distinct questions?
 - The incorrect option choices should be as **homogeneous** as possible with the correct answer (i.e., in length, format, language, number of components) (NBME, 2020).

How to Design Meaningful Feedback

FEEDBACK	Choice	Choice A: You ask Mrs. Glass to "Mark a point on the line that describes your pain. This side of the line means no pain and this side means the worst pain you've had." You point to the line on a sheet of paper.
	Clinical Outcome	Outcome: Mrs. Glass is moaning and very restless. She pushes the VAS paper away from her.
	Rationale	Why did this happen? The VAS is a useful pain severity scale for patients unable to complete longer, multidimensional pain assessment tools. However, Mrs. Glass is living with very advanced dementia, so a more appropriate strategy would be to focus on observing pain behaviours.
	Next Steps	<i>This was not the ideal outcome. Go back and try a different approach.</i>

When a learner makes a choice in a clinical scenario question, they immediately receive feedback on their choice. For feedback to be meaningful, it must have significance. In other words, feedback must provide enough information to lead the learner through correcting errors and reinforce the correct information in the correct context.

To this end, each option's feedback consists of four parts, the *choice*, the *outcome*, the *rationale*, and the *next steps*.

1. Choice

Include a summary of the choice that the learner made (e.g., *You chose to...*). This provides the learner with the correct context.

2. Outcome

- The feedback should include the **clinical outcomes** of both the correct and incorrect or “less ideal” choices and the rationale for the outcome (Moore, 2016, 2018).
- The outcome shows the learner a **realistic clinical consequence** of their decision. For example, to design an outcome for a question asking about symptom management, ask yourself, *would this choice cause the patient's symptoms to persist, worsen, or resolve?*
- Try to design the outcome to “show” the learner a consequence rather than “tell” the learner a consequence (Moore, 2013, 2016). For example, instead of simply telling the learner that the patient's symptom became more severe, ask yourself, *what would this look like? How would you see that the patient's symptom has become worse?*
- You can design the outcome to be a **short-term** clinical outcome of a decision or **long-term** clinical outcome of a decision (Posel, McGee, & Fleischer, 2015).
- Adding clinical outcomes allows learners to understand their mistakes and see that their choices have consequences (Posel et al., 2015). This allows learners to correct errors.

3. Rationale

- Include an expert rationale that ties back to course material or clinical guidelines.
- Link the rationale to the clinical outcome, i.e., explain why the clinical outcome happened because of their choice.
- Link the clinical outcome with evidence-based rationale, e.g., clinical guidelines, worked examples, communication strategies, basic science concepts (Posel et al., 2015).

4. Next Steps

- If learner made an incorrect choice, you can include links to the evidence/guidelines/course material that they should review based on the mistake they made.
- Encourage learners who chose an **incorrect** option to re-try the question, instead of providing the correct answer in the feedback.

- Encourage learners who chose the **correct** option to look at the consequences for the incorrect/less-ideal options as well.

Immediate feedback with clinical outcomes, rationales, and evidence tied to the individual learner's choices can develop the learner's clinical reasoning (Posel et al., 2015).

What to Avoid When Designing Feedback

- ✓ Avoid duplicating the same feedback for all options. Each option should have unique feedback based on the learner's choices.
- ✓ Avoid feedback styles that do not show learners a consequence of their choice:
 - **Corrective Feedback Only**, e.g., "Incorrect!" (Moore, 2013, 2016, 2018)
 - **Explanatory Feedback Only**, e.g., "Your choice was incorrect *because...*" (Moore, 2013, 2016, 2018)
 - **Ego-directed feedback**, e.g., "Well Done!" or "Great Job!" (Clark & Mayer, 2016)

When to use Clinical Scenario Questions in eLearning?

- Clinical Scenarios allow learners to practice clinical reasoning skills through practicing problem solving in a safe environment (Posel et al., 2015). In eLearning modules, learners can practice making clinical decisions **beyond their current levels of competence** without compromising patient safety (Posel et al., 2015).
- This style of question can be used to practice/reinforce:
 - Communications skills (e.g., appropriate language to use during professional vs. patient communication; use of open-ended questioning when taking a history).
 - Accurate assessment or management of a case.
 - Appropriate clinical choices.
 - Application of Basic Science principles to a case (Posel et al., 2015).
- eLearning course authors can include **uncommon cases** or **medical emergency situations** not regularly available to clinicians (Posel et al., 2015).

Instructional Design Tips

- ✓ Learners become better at solving problems by practicing solving lots of problems.
- ✓ Include enough practice to achieve your course's Learning Objectives (Clark & Mayer, 2016).
- ✓ Distribute practice throughout learning (i.e., not aggregated in one final practice quiz) (Clark & Mayer, 2016).

Extending the Clinical Scenario Question

- Chain a series of 3-5 scenario questions around a single case stem to create a linear *Case Simulation*.
- Link multiple questions into a *Branching Scenario*. Doing this allows learners to recover from less ideal choices.
- Add multimedia where it would be beneficial to do so:
 - **Visuals:** Include patient photographs or illustrations to show visual signs or symptoms (e.g., dermatological symptoms). Include medical imaging if applicable to the case.
 - **Audio:** Include audio to demonstrate audible signs/symptoms (e.g., respiratory symptoms).
 - **Video:** Use video to show the case vignette. Stop the video at a clinical decision points to ask a clinical scenario question with structured feedback.
 - See Ryerson University's *Virtual Healthcare Experience Nursing Simulations* (Verkuyl et al., 2019) for multiple examples of branching scenarios using video: <https://de.ryerson.ca/games/nursing/hospital>
 - See H5P's *Interactive Video Tool*: <https://h5p.org/interactive-video> (*A free and open-source tool for adding question overlays to a video case*)

References & Further Readings

- Clark, R. C., & Mayer, R. E. (2016). Does Practice Make Perfect? *e-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning* (4 ed., pp. 265-292): Wiley.
- Medical Council of Canada. (2010). *Guidelines for the Development of Multiple-Choice Questions*. Retrieved from <https://mcc.ca/media/Multiple-choice-question-guidelines.pdf>
- Moore, C. (2013). Feedback in elearning scenarios: Let them think! Retrieved from <https://blog.cathy-moore.com/2013/01/feedback-in-scenarios-let-them-think/>
- Moore, C. (2016). Scenario mistakes to avoid #1: Eager-beaver feedback. Retrieved from <https://blog.cathy-moore.com/2016/04/scenario-mistakes-to-avoid-1-eager-feedback/>
- Moore, C. (2018). Mini-scenarios: How to help people recover from mistakes. Retrieved from <https://blog.cathy-moore.com/2018/04/mini-scenarios-how-to-help-people-recover-from-mistakes/>
- NBME. (2020). *National Board of Medical Examiners (NBME) Item-writing Guide - Constructing Written Test Questions for the Health Sciences*. Retrieved from <https://www.nbme.org/item-writing-guide>
- Posel, N., McGee, J. B., & Fleischer, D. M. (2015). Twelve tips to support the development of clinical reasoning skills using virtual patient cases. *Med Teach*, 37(9), 813-818. doi:10.3109/0142159x.2014.993951
- Verkuyl, M., Lapum, J. L., St-Amant, O., Hughes, M., Romaniuk, D., & Mastrilli, P. (2019). Designing Virtual Gaming Simulations. *Clinical Simulation in Nursing*, 32, 8-12. doi:<https://doi.org/10.1016/j.ecns.2019.03.008>

Clinical Scenario Question Template

Step 1. Instructional Design

Learning Objective of Clinical Scenario: _____

What knowledge/content is being applied? *(Basic science? Assessment? Diagnosis? Management? Communications skills?)*

Where/How is this content covered in the course? *(Do the learners have enough background to achieve the learning objective of the scenario?)*

What is the clinical decision point? _____

Which evidence-based practice resources guide this clinical decision? *(Practice Guidelines? Frameworks? Basic science concepts? Research Studies? Drug Monographs?)*

Step 2. Clinical Vignette

(You do not have to include every item below. Include only the case information necessary for the learner to make a decision.)

Age, Gender _____

Site of Care _____

Presenting Complaint _____

Duration _____

Patient History _____

Physical Findings _____

Results of Diagnostic Studies _____

Initial Treatment, Subsequent Findings, etc. _____

Step 3. Lead-in *(A clinical decision-point that matches the Learning Objective in Step 1.)*

_____?

Step 4. Options

Correct Option _____

Distractor Option #01 _____

What mistake was made? _____

- Is this option a realistic decision/action that a new trainee would make?*
- Is this option homogeneous with the correct option (i.e., in length and format)?*

Distractor Option #02 _____

What mistake was made? _____

- Is this option a realistic decision/action that a new trainee would make?*
- Is this option homogeneous with the correct option (i.e., in length and format)?*

Distractor Option #03 _____

What mistake was made? _____

- Is this option a realistic decision/action that a new trainee would make?*
- Is this option homogeneous with the correct option (i.e., in length and format)?*

Step 5. Feedback

Correct Feedback

Correct Choice: You chose to...

Clinical Outcome: *(What is an immediate or long-term positive outcome of this choice?)*

Expert Rationale: *(Why did the outcome above happen? What evidence/guidelines/course material validate this correct option?)*

This happened because...

Next Steps: *(Should the learner review any material? Or be encouraged to look at the incorrect outcomes?)*

Incorrect Feedback - **Distractor Option 01**

Incorrect Choice: You chose to...

Clinical Outcome: *(What is an immediate or long-term negative/less-ideal outcome of this choice?)*

Expert Rationale: *(Why did the outcome above happen? What evidence/guidelines/course material validate this as an incorrect option?)*

This happened because...

Next Steps: *(Should the learner review any material? Or be encouraged to try another option?)*

Incorrect Feedback - **Distractor Option 02**

Incorrect Choice: You chose to...

Clinical Outcome: *(What is an immediate or long-term negative/less-ideal outcome of this choice?)*

Expert Rationale: *(Why did the outcome above happen? What evidence/guidelines/course material validate this as an incorrect option?)*

This happened because...

Next Steps: *(Should the learner review any material? Or be encouraged to try another option?)*

Incorrect Feedback - **Distractor Option 03**

Incorrect Choice: You chose to...

Clinical Outcome: *(What is an immediate or long-term negative/less-ideal outcome of this choice?)*

Expert Rationale: *(Why did the outcome above happen? What evidence/guidelines/course material validate this as an incorrect option?)*

This happened because...

Next Steps: *(Should the learner review any material? Or be encouraged to try another option?)*
