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Multiple choice questions to assess continuing professional development and practice improvement

Assessments for activities for continuing professional development (CPD) should be a test of the learning achieved through that activity. Learning can occur at many levels, from simple recall through to problem solving. Assessments should target all levels of learning appropriate for the given content.

If learning objectives for an activity are written in measurable terms, they will provide the basis for what is to be assessed and how. The amount of attention given to certain content should reflect its relative importance.

Multiple choice questions (MCQs) are the most commonly used style of assessment used in pharmacy CPD. Critics of MCQs argue that higher levels of learning cannot be tested with MCQs. However this criticism can more often be attributed to flaws in the construction of the questions rather than an inherent weakness in this style of assessment. Appropriately constructed MCQs can measure knowledge, comprehension, application and analysis.

The disadvantages should be acknowledged though: MCQs assess answer recognition rather than recall; MCQs allow for guessing; and constructing effective MCQs can be difficult and time-consuming.

Writing effective MCQs

MCQs consist of a *stem* and several *options*. Both need to be considered when constructing effective MCQs. The following guidelines will assist, but should not be considered absolute rules.

Writing stems

The stem is usually composed first and is best written as a complete sentence or question. Ideally the stem should be answerable without all the options being read.

The stem should include **only the necessary information** and be kept as short as possible. It should not be used as an opportunity to teach, nor contain statements that are informative but not needed to select the correct option. The stem is generally longer when application of knowledge is being tested as opposed to the recall of an isolated fact. Use of patient cases is a good way to test application of knowledge.

Question testing recall:
Which of the following conditions manifests with hyperkalaemia?
a.

Question testing application:
A 30-year-old man presented with a four-month history of dyspnoea, low-grade fever, cough and fatigue. Given the following pathology results, what is the most likely diagnosis?
a.

The stem should be stated so that only one of the options can be substantiated and that option should be indisputably correct. If the correct option provided is not the only possible response, the stem should include the words *of the following*. When more than one option has some element of truth or accuracy, the stem should ask for selection of the *best answer* rather than the correct answer.

Questions should generally be constructed to ask for the *correct* answer and not a *wrong* answer. Negatively-posed questions (e.g. which of the following is incorrect? all of the following except…) may be appropriate in some circumstances, but should be used selectively. When negative stems are used, the negative term should be capitalised to make sure it is noticed.

Absolute terms such as *never, always, all* or *none* should not be used in the stem or the options. Few ideas or situations are absolute or universally true.

Imprecise terms such as *seldom, rarely, occasionally, sometimes, few* and *many* are not universally understood and should be avoided.

Writing options

The best number of options is three to five. There is no rule that the number of options needs to be uniform.

Writing plausible distractors is the most challenging aspect of creating MCQs. The best distractors are:

- Statements that are accurate but do not fully meet the requirements of the problem
- Incorrect statements that seem right to the learner.

Each incorrect option should be plausible but clearly incorrect. Implausible, trivial or nonsensical distractors should not be used. Ideal distractors may be determined by asking the questions:

- What do people usually confuse this entity with?
- What is a common error in interpretation of this finding?
- What are the common misconceptions in this area?

The distractors should appear as similar as possible to the correct option in terms of grammar, length and complexity.

Options should not include the phrases *none of the above* (problematic when options are not absolutely true or false, and only informs the learner about what is not correct) or *all of the above* (problematic as only 2 options need to be recognised as correct for this to be the correct option).

Acronyms or abbreviations without some qualification after them should be avoided.

Options should be placed in logical order, if there is one (e.g. if answers are numbers, the options should begin with the smallest value and proceed to the largest).

Options in one MCQ should not reveal information that automatically allows the learner to know the answer to another MCQ. Equally, avoid an MCQ that requires the learner to know the answer to another MCQ to be able to answer it. MCQs must be independent of each other.

The position of the correct response should be varied.

Summary of guidelines for writing MCQs[1]

Questions should:

- be related to the learning objectives for the activity
- test at the same level of learning as the objectives are designed to assess
- reflect different levels of learning (knowledge, comprehension, application and analysis).

Stems should:

- provide a complete statement or question
- include only relevant information
- have a length as short as possible (relative to the level of learning being tested)
- ask for the correct (not wrong) answer
- avoid absolute terms
- avoid imprecise terms
- define acronyms and abbreviations.

Options should:

- follow grammatically from the stem
- be similar in grammar, length and complexity
- have distractors that are plausible but clearly incorrect
- avoid *none of the above* and *all of the above*
- follow a logical order
- be independent
- vary the position of the correct answer.

[1] Collins J. Education techniques for lifelong learning: Writing multiple-choice questions for continuing medical education activities and self-assessment modules. RadioGraphics 2006;26:543-51.

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Further reading

- Constructing written test questions for the basic and clinical sciences, 3rd edition (revised). Philadelphia: National Board of Medical Examiners, 2002. Available at www.nbme.org/publications/item-writing-manual-download.html