A Glimpse Behind the Curtains: Exam Question Development

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Timeline

- January - March:
  - Assess # of existing questions per category
  - Identify areas of need
  - Assign question writers to topics
- April - May:
  - Official question writing period
- June - August:
  - Question review and edit (several web-based sessions)
- August - September:
  - ABR staff final question edit (figures, tables etc.)
- October:
  - Question selection
### Writing assignments based on need

<table>
<thead>
<tr>
<th>BP</th>
<th>Simple used</th>
<th>Simple unused</th>
<th>Complex Used</th>
<th>Complex Unused</th>
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</tbody>
</table>
>900 questions written over 18 years
Still clinically relevant?
Good question?
  No: can it be rescued/rewritten?
In ABR format?
  Quick edit
  Rewrite
  Eliminate from Pool
How Long Does Writing Take?

- Simple question (1 step)/complex question (2 steps)
- Good question writing is an acquired skill
- ~ 1 hour for simple, ~2 hours for complex question
- Experiment: Try to write a good question based on what I am going to tell you
Types of Questions

- Calculations, e.g.
  - SAD/SSD conversions

- Information recall, e.g.
  - Tolerances of QA tests

- Clinical judgment, e.g.
  - What is the follow-up to this QA test result?
Exam Developer Software

Stem

Answer Keys
The Following Demo Question is from an Outdated AAPM TG to Avoid Any Overlap with Current Exam Questions
What Makes a Good Stem?
Good

A linear accelerator is calibrated according to AAPM TG-21. Given the data in the table below, what is the cavity gas calibration factor \( N_{\text{gas}} \) for this chamber?

Bad

Calculate the cavity gas calibration factor \( N_{\text{gas}} \). The data for the chamber used is listed below. Assume AAPM TG-21 is used as calibration protocol.
2. Completeness

**Good**

A linear accelerator is calibrated according to AAPM TG-21. Given the data in the table below, what is the cavity gas calibration factor $N_{gas}$ for this chamber?

**Bad**

Given the data in the table below, what is the cavity gas calibration factor $N_{gas}$ for this chamber?
3. Single Concept

**Good**

A linear accelerator is calibrated according to AAPM TG-21. Given the data in the table below, what is the cavity gas calibration factor $N_{\text{gas}}$ for this chamber?

**Bad**

A linear accelerator is calibrated according to AAPM TG-21. Given the data in the table below, what is the cavity gas calibration factor $N_{\text{gas}}$ for this chamber, and which gradient correction should be used?
4. Positively Worded

**Good**

A linear accelerator is calibrated according to AAPM TG-21. Given the data in the table below, what is the cavity gas calibration factor $N_{gas}$ for this chamber?

**Bad**

A linear accelerator is calibrated according to AAPM TG-21. Which of the following component is not used to calculate the cavity gas calibration factor $N_{gas}$?
5. Clinically Relevant

• Example: Technology
  • Orthovoltage? Maybe not ...
  • Tomotherapy? Yes, but to what detail?
  • Vero, Viewray, CK, Protons, Mevion ...

• Example: Clinical Techniques
  • Electron boost for neck nodes? Standard of care 10 years ago, now replaced by IMRT
  • Timing of retiring questions, introducing new techniques
6. Non-controversial

- Usually new topics without guidance documents, e.g. Detector response factors in small field dosimetry

- Time needed after guidance document publication for clinical implementation

- Clinical implementation to consistent residency training
Examples for Good Answer Keys

**Good**
- Three options:
  - Increase
  - Decrease
  - Stays the Same
- 4 Options in Pairs
  - S/N increases
  - S/N decreases
  - Resolution increases
  - Resolution decreases

**Bad**
- Length and structure change:
  - S/N
  - FOV
  - Missing tissue artefact
- One pair:
  - S/N increases
  - S/N decreases
  - Resolution increases
  - Missing tissue artefact
What Comes Next?

- Questions get added to exam library
- Next step: selecting questions for the exam
ABR Therapy II
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