All you need to know about the European Board of Ophthalmology (EBOD) examination:

The evaluation process

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Evaluation remains a key point

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Abstract
Purpose European postgraduate medical assessment have developed during the last 25 years. Currently, all European medical
Perspectives in Ophthalmology

History and future of the European Board of Ophthalmology Diploma examination

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Perspective in Ophthalmology

Evaluation of adding item-response theory analysis for evaluation of the European Board of Ophthalmology Diploma examination

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Statistical evaluation of multiple-choice assessments

Development and validation of a statistical analysis method to monitor the European ophthalmology exit examination, and evaluation of examination questions and methods

EBOD: Increase of candidates

Increase with 177%
Structure of the EBOD Examination

• Written examination (MCQ paper)
  – 40% of the total candidate score
  – 52 questions, each with 5 independent true-false items
  – 10 pre-defined topics
  – Available in English (master), French and German (translations)
Structure of the EBOD Examination

• Oral examination (Viva Voce)
  – 60 % of the total candidate score
  – 4 topics
  – Available in English (basic language) and (if possible) in French or German (native languages) and (whenever possible) in other native languages of the candidate
Structure of the EBOD Examination

Table 1. The structure of the written and oral part of the EBOD examination.

<table>
<thead>
<tr>
<th>Topics of the written part of EBOD</th>
<th>Topics of the oral part of EBOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Optics, Refraction and Contact lenses</td>
<td>A. Optics, Refraction, Strabismus and Neuro- ophthalmology</td>
</tr>
<tr>
<td>2. Paediatric ophthalmology and Strabismus</td>
<td>B. Cornea, External diseases, Orbit and Ocular adnexa</td>
</tr>
<tr>
<td>3. External, Corneal and Adnexal disease</td>
<td>C. Glaucoma, Cataract and Refractive surgery</td>
</tr>
<tr>
<td>4. Glaucoma, Cataract and Refractive surgery</td>
<td>D. Posterior segment, Ocular inflammation and Uveitis</td>
</tr>
<tr>
<td>5. Retina, Vitreous and Uvea</td>
<td></td>
</tr>
<tr>
<td>6. Neuro-ophthalmology</td>
<td></td>
</tr>
<tr>
<td>7. Orbital disease and Oculoplastic surgery</td>
<td></td>
</tr>
<tr>
<td>8. General medicine relevant to ophthalmology</td>
<td></td>
</tr>
<tr>
<td>9. Ophthalmic pathology, Microbiology and Immunology</td>
<td></td>
</tr>
<tr>
<td>10. Pharmacology and Therapeutics</td>
<td></td>
</tr>
</tbody>
</table>
Multiple independent T/F items
Multiple independent T/F items

- Advantages for EBOD candidates
  - Reliable in case of translation
    ⇒ choice of language ≠ (dis)advantage
  - Accessibility (e.g. dyslexia)
    ⇒ not too complicated for candidates
  - Duration of the examination (less MCQ’s)
    ⇒ reduced stress level of candidates
  - Assessment of partial knowledge
    ⇒ not knowing the answer of 1 item is not a disadvantage
Multiple independent T/F items

• Disadvantage for EBOD candidates
  – Probability of guessing right: 50 % (20-25 % for SBA)
    ⇒ level of (weakest) candidates is overestimated (oral examination)

• How to overcome this disadvantage?
  – Introduction of negative marking for incorrect/blank answers
    ⇒ Increase of discriminative power of assessment
    ⇒ Reduction of (wild) guesses (weakest candidates)
EBOD Examination: Scoring rules

- Score of +1 in case ONLY the correct answer has been indicated
- Score of 0 in case ONLY the “don’t know” option has been indicated
- Score of -0.5 in ALL other cases
EBOD Written Examination

The EBO written MCQ examination:

- The pass mark of the MCQ paper (i.e. score of 6) is set at the average minus 1 standard deviation (SD):

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCQ</td>
<td>189 ± 14</td>
<td>191 ± 15</td>
<td>184 ± 15</td>
<td>204 ± 13</td>
<td>146 ± 25</td>
<td>134 ± 23</td>
<td>159 ± 24</td>
<td>148 ± 24</td>
</tr>
<tr>
<td>Average ± Stdev</td>
<td>189 ± 14</td>
<td>191 ± 15</td>
<td>184 ± 15</td>
<td>204 ± 13</td>
<td>146 ± 25</td>
<td>134 ± 23</td>
<td>159 ± 24</td>
<td>148 ± 24</td>
</tr>
</tbody>
</table>

- The result of the MCQ paper counts for 40% of the final score
Overall performance of EBOD

- Kuder-Richardson-20: **Reliability** of the examination
  - Increase from 0.78 (EBOD 2009)
  - to 0.92 (EBOD 2010)
  - 0.91 (EBOD 2011)
  - 0.92 (EBOD 2012)
  - 0.92 (EBOD 2013)

  Use of negative marking
Parameter a (discrimination)
Slope of the tangent
\( y = ax + cst \) of the steep part
of the item characteristics curve

Parameter b (difficulty)
Ability level for a 50% probability

Parameter c (guessing)
Probability for a non-able candidate

\[
p_i(\theta) = c_i + \frac{1 - c_i}{1 + e^{-a_i(\theta - b_i)}}
\]
Success rate of EBOD Examination

The EBOD examination success rate:

- Good candidate level ⇒ high success rate:

<table>
<thead>
<tr>
<th>Year</th>
<th>2006</th>
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<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>88.1 %</td>
<td>89.2 %</td>
<td>90.8 %</td>
<td>88.6 %</td>
<td>92.0 %</td>
<td>91.5 %</td>
<td>89.6 %</td>
<td>89.5 %</td>
</tr>
</tbody>
</table>

- Until 2009 no negative marking was used
- Introduction of negative marking since EBOD 2010
- Pass rate remained stable over the years
Is negative marking discriminating?

• The main argument against negative marking as formulated in literature is that it would be discriminating towards female candidates, as they are expected to take less risks (educated guesses)

• On the other hand, no objective data are available in literature to support this hypothesis...
Is negative marking discriminating?

• Different **strategies** to complete EBOD MCQ-test?
  Assessed by evaluating the use of *“DON’T KNOW”* option
Is negative marking discriminating?

- Statistically **significant** difference between 🖤 and 🧑
  - EBOD 2010 / 2011 / 2012:
    🖤: 13.57% / 13.37% / 10.84% of test items
    🧑: 16.47% / 15.85% / 11.27% of test items  \( p < 0.05 \)
  - EBOD 2013:
    🖤: 13.65% of test items
    🧑: 14.90% of test items  \( p < 0.05 \)
Is negative marking discriminating?

**EBOD 2010 / 2011 / 2012**

- Average absolute MCQ-scores \((p > 0.05)\)
  - **♀**: 148.21 (n = 168)  
    136.24 (n = 159)  
    160.62 (n = 183)  
  - **♂**: 143.36 (n = 142)  
    132.25 (n = 172)  
    158.24 (n = 175)

**EBOD 2013**

- Average absolute MCQ-scores \((p > 0.05)\)
  - **♀**: 147.42 (n = 209)
  - **♂**: 147.89 (n = 231)
Is negative marking discriminating?

EBOD 2010 / 2011 / 2011

- Converted MCQ-scores
  - All scores: \( p > 0.05 \)
  - Pass-fail: \( p > 0.05 \)

EBOD 2013

- Converted MCQ-scores
  - All scores: \( p > 0.05 \)
  - Pass-fail: \( p > 0.05 \)
Is negative marking discriminating?

- Until 2009 negative marking was not applied
- But even without negative marking ...

... significant differences between male and female candidate scores were **NOT** observed!
Alan Ridgway Award (MCQ’s)

2010
Female candidate (Austria)

2011
Male candidate (Greece)

2012
Female candidate (Turkey)

2013
Male candidate (Germany)
Evaluation remains a key point ...

- For the **European Board of Ophthalmology** as organiser of the EBOD Examination:
  - Reliability of the EBOD Examination
  - Statistical performance parameters of the individual test items

- For the **candidates** of the EBOD Examination
  - Guessing by less competent candidates
  - Discrimination towards female candidates
UEMS-CESMA Meeting – November 16th, 2013
Crowne Plaza Brussels – Le Palace
EUROPEAN BOARD OF OPHTHALMOLOGY (EBO)

Permanent working group of the Ophthalmology Subspecialty Section of the European Union of Medical Specialists (UEMS)

REPORT FOR THE APPRAISAL BY THE UEMS COUNCIL OF EUROPEAN SPECIALIST MEDICAL ASSESSMENTS (CESMA) OF THE EUROPEAN BOARD OF OPHTHALMOLOGY DIPLOMA (EBOD) 2014 EXAMINATION
Thank you ...