Standard setting methodology

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This objective presentation is delivered in my capacity as **UEMS-CESMA liaison officer for Appraisals** and is not influenced by my appointment at the University of Antwerp and at the Antwerp University Hospital, nor is it influenced by my psychometric consultancy activity for the European Society of Cardiology (ESC)

What is standard setting?

Standard setting is the process of determing *how much is good enough*. In medical education the standard is intimately associated with the notion of *competence*, i.e. point that separates competence and incompetence.
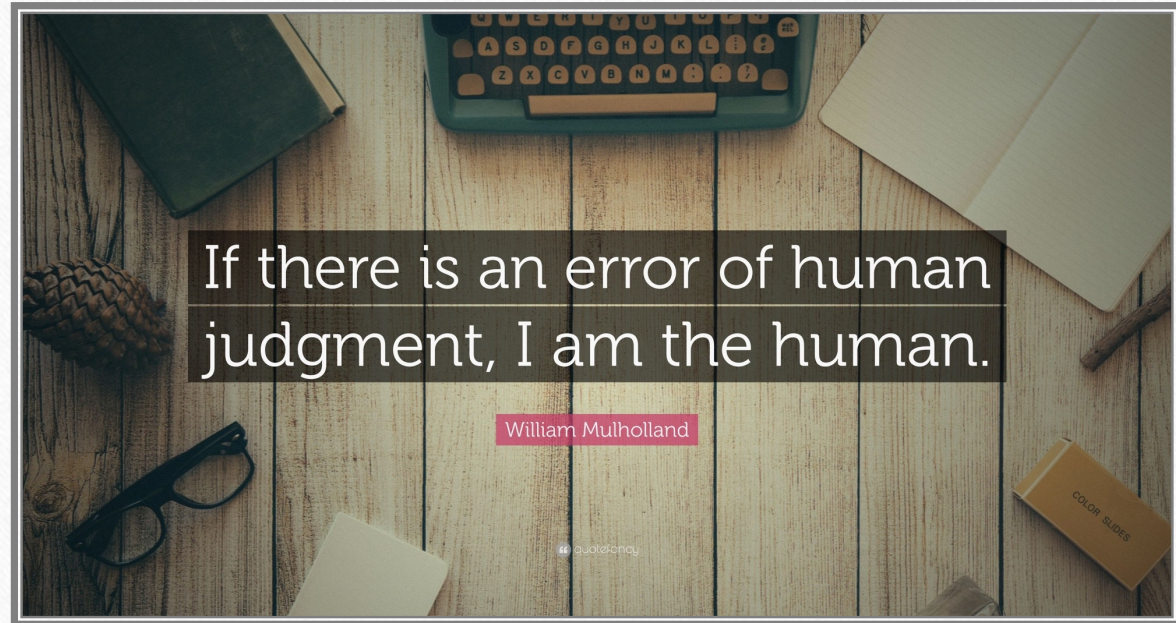
Standard setting involves human judgment

*The process of **setting a standard** when **pass/fail decisions** have to be made inevitably involves **judgment** about the **point** on the test score scale where **performance is deemed adequate** for the **purpose** for which the **examination** is set*

If there is an error of human judgment, I am the human.

William Mulholland

Quote from *Abstract* of the AMEE Guide on *Setting and Maintaining Standards in Multiple Choice Examinations*

The **aim** of standard setting procedures is to **minimize such errors** while **accounting for the varying difficulty** of examinations

Take home messages
(AMEE Guide)

"Your doctor ordered some tests. If you pass, you get to go home. If you fail, you'll have to repeat 9th grade."

GLASBERGEN

- Standards set for examinations **which certify competence** should be **criterion-referenced** rather than norm-referenced

- All standard setting methods involve **judgment**, with the possibility of false positive and false negative **errors around the cut-off point**

Take home messages

(AMEE Guide)

- The **degree of error** can be **substantially reduced** by the **proper selection**, **training** and **monitoring** of judges

- While several standard setting methods are available, the **Angoff method** is the **most popular**, though the **flexibility** afforded by the **Hofstee method**, is more acceptable

Take home messages
(AMEE Guide)

- Studies directed towards **validation** of the method used should be undertaken in the **initial stages** of its use, so that the method can be **defended on scientific grounds**

Take home messages
(AMEE Guide)

- Standards **can be maintained** by test equating methods using "**marker questions**" from previous examinations to **determine the relative difficulty** of each examination

Take home messages
(AMEE Guide)

- A **practical procedure** would be to specify the performance standard and **develop a test to fit that standard**, rather than apply a standard setting procedure to an existing test

Kane M. (1994). Validating the performance standards associated with passing scores. Review of Educational Research 64:425-461

Standard setting methods

Norm-referenced	Criterion-referenced
• Standardised pass/fail rate	• Pre-fixed cut-off score
• Easy to implement	• Focus on individual items
• Doesn't adjust for ability	• Recommended when competence is certified through the examination
• Not recommended for examinations with purpose to	• Time consuming

The **disadvantages** of both types of methods diminish the **credibility** and **defensibility** of the methods, which has lead to the development of **compromise** or hybrid standard setting methods

Standard setting methods

Norm/Criterion-referenced

- The disadvantages of both norm-referenced and criterion-referenced standard setting methods diminish the credibility and defensibility of these methods, which has lead to the development of compromise or hybrid standard setting methods

Compromise methods

- Suitable for overall pass/fail
- Evidence-based
- Simple standard setting
- Can "miss the mark", prone to outliers
- Not first choice for high-stakes examinations

Standard setting methodologies

Norm-referenced = examinee-centered	Criterion-referenced = test-centered	Compromise/hybrid = combination
• Set proportions • SD from mean • Cohen's method • Borderline group • Contrasting groups	• Fixed standard • Nedelsky • Angoff • Ebel	• Hofstee • De Gruijter • Beuk • Book-mark

More details on this methods have been presented at the UEMS-CESMA meeting in December 2022 (Brussels)

General conclusions

- In **high-stakes examinations** important decisions are made in regard to **competence** and incompetence, which may affect, on the one hand, the **careers of professionals**, and on the other hand, the **safety** of the professional's clients.
- There is **no perfect** method for standard setting!
- A wide **range** of standard setting methods exists.
- The standard setting method chosen needs to be **fit for purpose**.
- The choice for a standard setting method can be a question of **policy**, depending on **credibility**, **available resources** and the **level** of examination.