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# The Art of Excellence: Revolutionizing Indian Medical Assessment in the Global CBME Landscape

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**ABSTRACT**

**Background and Objectives:** Standard setting in medical education is a vital process that defines the minimum competency levels necessary for medical professionalism. Various standard-setting methods are employed globally to ensure assessments accurately evaluate knowledge, skills, and clinical competence.This study aims to examine different methods for standard setting in medical education, analyze their theoretical foundations, practical applications, and evaluate their relevance to the Indian medical education context.

**Materials and Methods:** The study reviewed standard-setting methods categorized as absolute, relative, and hybrid approaches. Absolute methods (Angoff, Ebel, and Hofstee), relative methods (Norm-Referenced and Borderline Group Methods), and emerging trends including artificial intelligence-driven standard setting were analyzed. Global practices such as USMLE(United States Medical Licensing Examination), PLAB(Professional and Linguistic Assessments Board), andNEXT( National Exit Test )were compared with current Indian approaches.

**Results:** The analysis revealed that absolute methods establish fixed performance criteria based on expert judgment, while relative methods determine passing scores based on peer performance comparisons. Emerging technology-enhanced methodologies showed promise in enhancing objectivity and consistency. Significant challenges identified in the Indian context include faculty development needs, resource disparities, limited technical expertise, and the scale of implementation across diverse medical institutions.

**Conclusion:** The study emphasizes the need for dynamic, evidence-based standard-setting approaches that balance academic rigor with practical competency assessment. For Indian medical education, the path forward includes faculty development in assessment methodologies, technology-enhanced assessment systems, gradual transition from norm-referenced to criterion-referenced approaches, and development of India-specific models that maintain global standards while addressing local healthcare needs.

***Keywords:*** *Standard setting; Medical education; Assessment methods;CBME-(Competency-based medical education);NMC ( National Medical Commission); Angoff method; OSCE(Objective Structured Clinical Examination); NEXT ; Criterion-referenced assessment*

## 1. INTRODUCTION

Standard setting in medical education establishes consistent criteria for evaluating student performance, competencies, and qualifications. It ensures that all medical professionals meet minimum level of knowledge, skills, and ethical standards before practicing.

Internationally, organizations like WFME( World Federation for Medical Education), ACGME(Accreditation Council for Graduate Medical education),and GMC (General Medical Council) set guidelines for medical training and assessment. In

India, NMChas introduced reforms aligning medical education with global practices while addressing country-specific challenges like rural healthcare delivery and resource constraints. With a diverse and vast medical education system, NMC plays a pivotal role in implementing uniform curricula, standardized exams NEET (National Eligibility cum Entrance Test)and NEXT, and CBME to ensure all doctors are trained to provide safe and effective healthcare.

History of Standard Setting in Medical Education ;

Standard setting has evolved from unregulated learning to a structured, competency driven approaches. Pre-19th Century education was apprenticeship-based without formal assessments. The 1910 Flexner Report (U.S) emphasized science-based curricula influencing global reforms. General Medical Council (GMC, UK) established medical licensing requirements, setting a precedent for global regulation.

MCI (Medical council of India), formed in 1934, introduced guidelines for medical education and accreditation. Post-Independence (1950s-1980s) saw expansion of medical colleges. From 1997-2022, reforms focused on competency-based training and common entrance tests.

Recent developments include NEET (2016), a nationwide entrance exam replacing multiple tests[3]. NMC Act (2019) replaced MCI with NMC[2], CBME (2019) shifting focus from rote learning to skill-based training[1], and the upcoming NEXT Exam standardizing qualifications before practice[4].

## 2. CATEGORIES OF STANDARD SETTING

1.Absolute vs Relative standard settings:

Relative standards calculate cut-offs where number of passing candidates is RELATIVE to other examinees.These are most appropriate for examinations where the purpose is to identify a certain number of examinees.

Absolute standardsuse pre-defined criteria, appropriate for competence tests,final/exit examinations andcertification/ licensure tests.

2. Compensatory vs Conjunctive method:

Compensatory Methods allowa person to "make up" for weaker areas with stronger performance in others.

The conjunctive methodrequires the individual to meet or exceed a minimum standard in each individual area separately

3.Test-centered vs Examinee centered

Test-centered methods focus on test difficulty and content .Experts evaluate what score should be considered "passing" based on difficulty level, item performance, and the purpose of test. The focus is more on how well the test distinguishes between different levels of ability.

Examinee-centered methods focus on examinees performance, assessing the abilities relative to test goals . The focus is on what the examinee should be able to demonstrate in orderto be considered competent.

4.Pre- test vs Post test methods

Pre-test methods set standards before exams ensuring consistency but require expert judgment. Post-test methods account for actual performance but may not guarantee competency. Hybrid approaches :(e.g., Hofstee, Borderline Group) combine elements of both .

**PRE-TEST STANDARD SETTING METHODS ( Absolute Methods )**

- Angoff Method: Experts estimate how many minimally competent candidates will answer each question correctly.
- Nedelsky Method: Experts determine which incorrect options a borderline candidate can eliminate.
- Ebel Method: Questions are classified by difficulty and relevance, and experts define competency levels.
- Bookmark Method: Items are ranked by difficulty, and a cutoff point is selected.

**POST -TEST STANDARD SETTING METHOD (Relative methods )**

- Fixed Percentage Method: Predefined percentage (e.g., 50% or 60%) is set as pass mark.
- Standard Deviation Method: Pass mark determined based on the average performance of the group (e.g., one standard deviation below the mean).
- Norm-Referenced Method: Top percentage of candidates pass, based on overall distribution.

**Hybrid Approaches**

- Hofstee Method: Combines expert judgment and actual student performance to set passing scores within predefined

range.

- Borderline Group Method: Average score of a group of borderline candidates determines the pass mark.

## 3. COMPARITIVE ANALYSIS OF METHODS

| Method | Description | Advantages | Disadvantages | Best Use Case |
|---|---|---|---|---|
| **Angoff** | Experts estimate probability of borderline candidate answering items correctly | • Well-researched<br>• Defensible<br>• Item-level analysis | • Time-consuming<br>• Cognitive difficulty of task<br>• Requires trained judges | MCQ exams with high stakes |
| **Ebel** | Classification of items by difficulty and relevance | • Considers item relevance<br>• Structured approach | • Complex matrix<br>• Subjective classifications | Written assessments where item relevance varies |
| **Hofstee** | Sets ranges for acceptable failure rates and cut scores | • Combines absolute and relative standards<br>• Practical | • Less conceptually pure<br>• Potential compromise | When both criterion and norm referencing are important |
| **Borderline Group** | Uses performance of actual borderline students | • Based on actual performance<br>• Intuitive | • Requires borderline group identification<br>• Sample size constraints | Performance assessments (OSCEs) |
| **Contrasting Groups** | Compares performance distributions of competent vs. incompetent groups | • Empirically based<br>• Visually interpretable | • Requires pre-classification<br>• Adequate Sample | When clear competent/incompetent groups exist |
| **Bookmark** | Experts identify the point in ordered items where borderline candidates struggle | • Efficient for large item bank<br>• Cognitively simpler task | • Requires IRT scaling<br>• Complex psychometrics | Large-scale standardized assessments |

### Competency-Based Medical Education in India

In 2019, NMC implemented CBME[6]. Key elements include defined outcomes and competencies for IMG'S (Indian Medical Graduate), foundation Course for new entrants, early clinical exposure, horizontal and vertical integration across disciplines, skill acquisition through dedicated labs, AETCOM (Attitude, Ethics, Communication) module[12] and electives promoting student choice[6].

### Current Standard Setting Methods in India

NMC introduced standard setting approaches[5]:

1. NEET: Employs normative approach with percentile ranks for undergraduate admission[3].
2. NEXT: Common final year examination serving multiple purposes including licensure, postgraduate entrance and screening for foreign medical graduates. The NEXT represents a significant shift toward criterion-referenced assessment[4], with passing standards set to ensure minimum competency rather than relative ranking.
3. Workplace-based Assessments: New curriculum incorporates tools like Mini-CEX (Mini-Clinical Evaluation Exercise) DOPS (Direct Observation of Procedural Skills), and CBD (Case based Discussions) with rubric-based standard setting[7].

4. Formative Assessments: Internal assessments increasingly use modified Angoff or borderline regression methods to set standards[8].

**Challenges in Indian Medical Education Standard Setting**

1.Faculty Development: Many faculty members lack training in modern

assessment and standard setting methods[13].

2.Resource Disparities: Wide variations exist between urban and rural medical colleges, with the latter often lacking resources[10].

3.Technical Expertise: Limited expertise in psychometric analysis and modern standard setting techniques.

4.Cultural Transition: Moving from traditional knowledge-focused examinations to competency-based assessments requires significant cultural change[9].

5.Scale Challenges: With over 700 medical colleges and approximately 90,000 medical students admitted annually, implementing standardized assessments presents logistical challenges[11].

Global Best Practices and Indian Adaptations

**Clinical Skills Assessment:**

While OSCE stations with borderline regression methods represent theinternational gold standard , India has adapted this approach to resource constraints. Many institutions now use structured clinical examinations with modified borderline group methods.

**Written Assessment Methods :**

Globalpractices employ standard setting methods like modified Angoff or Cohen's method for MCQ-based assessments. In India, while fixed passing scores remain common, select institutions implementcriterion-referenced methods. NMC now recommends modified Angoff approaches for high-stakes examinations.

**Postgraduate Assessment:**

Fellowship examinations by international bodies like Royal Colleges employ Hofstee and borderline regression methods. Indian postgraduate examinations are gradually incorporating similar approaches, though implementation varies across specialities and institutions.

Key Differences Between Global and Indian Approaches

| Aspect | Global Practices | Indian Practices |
|---|---|---|
| Standard-Setting Methods | More use of criterion-referenced methods (Angoff, Hofstee, Ebel) | Heavy reliance on norm-referenced and percentile-based systems |
| Medical Licensing Exam | Objective and standardized (e.g., USMLE, PLAB) | NEXT under development |
| Accreditation Standards | WFME-based, country-specific | NMC-based, evolving towards global benchmarks |
| Assessment Type | OSCE, MCQs, competency-based exams | Primarily MCQs, limited OSCE adoption |

**Innovative Approaches and Future**

Technological innovations reshaping standard setting include Computer-Based Testing allowing for item response theory applications, Virtual Patient Simulations enabling standardized clinical reasoning assessment[14] and artificial Intelligence tools analyzing performance patterns for refined cut scores. Programmatic Assessment aggregates multiple assessment points rather than setting standards for individual assessments.

**Continuous Quality Improvement:**

Leading medical education systems implement continuous quality improvement cycles including post-examination psychometric analysis, Standard setter training and regular review of performance standards. NMC has mandated similar processes for all medical colleges in India[15] though implementation remains in early stages.

## 4. CONCLUSION

No single method offers a universal solution; selection of an appropriate standard-setting approach must consider factors like assessment purpose, available resources, institutional context, and competencies being evaluated. Triangulation of multiple methodsoffers enhanced credibility and defensibility .

The Indian medical education system faces unique challenges including resource constraints, geographical disparities, and balancing international benchmarks with local healthcare needs. NMC's CBME implementation represents a significant shift toward outcomes-focused assessment, though implementation remains uneven.

Future imperatives include dynamic standards responsive to evolving healthcare needs ,inclusive standard-setting processesincorporating perspectives from diverse stakeholders and ongoing empirical validation of standards.For India, strengthening faculty development in assessment literacy, establishing regional standard-setting consortia ,and developing contextually relevant guidelines are essential.

standard setting in medical education embodies fundamental values about medical competence and patient safety. The standards we set reflect our collective vision of medical professionalism and our commitment to healthcare quality. As medical educators and policymakers navigate the complex landscape of standard setting, there is a need to balance scientific rigor with pragmatic feasibility, global benchmarks with local relevance, and assessment efficiency with educational impact. Through thoughtful implementation of evidence-based standard-setting practices, medical education systems in India and worldwide can better fulfill their fundamental mission, ensuring that every graduating physician possesses the competencies necessary to provide safe, effective, and compassionate care.

**Take Home Message:**

The future of standard setting in Indian medical education should involve faculty development[13], technology-enhanced assessment[14], gradual shift from norm-referenced to criterion-referenced approaches, development of India-specific models that account for local contexts while maintaining global standards and research into the validity and reliability of various methods in the Indian context.

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