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Ensuring Educational Quality Across Multiple Sites: Assessment and Standardization in Competency-Based Health Professions Education - A Scoping Review Protocol

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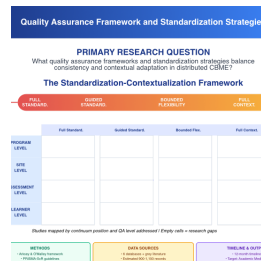
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We use this protocol and it's working

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Abstract

Introduction: Competency-based healthcare education is increasingly delivered across distributed sites, yet ensuring consistent quality standards and assessment approaches across multiple locations remains a significant challenge. Quality assurance frameworks for distributed competency-based education are poorly characterized, and there is limited understanding of how to balance standardization with local contextual needs while maintaining assessment rigor and inter-site comparability.

Purpose: To systematically map quality assurance frameworks, standards, and assessment approaches used to ensure consistent and effective competency-based healthcare education delivery across distributed sites.

Methods: Following Arksey and O'Malley's framework (with Levac's refinements) and PRISMA-ScR guidelines, this scoping review will include studies examining quality assurance systems, accreditation frameworks, and assessment approaches for competency-based healthcare education delivered across distributed sites from 2015-2025. A comprehensive search of PubMed/MEDLINE, Embase, Scopus, CINAHL, Web of Science, ERIC, and gray literature will be conducted. Two independent reviewers will screen titles, abstracts, and full texts. Data extraction will focus on quality assurance frameworks, assessment methods, standardization strategies, accreditation requirements, competency domains, inter-site comparability measures, and technology solutions supporting quality monitoring. Results will be synthesized using descriptive statistics and narrative synthesis.

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Guidelines

- PRISMA Extension for Scoping Reviews (PRISMA-ScR) Checklist
- Arksey and O'Malley Scoping Review Framework (with Levac refinements)
- PRESS (Peer Review of Electronic Search Strategies) guidelines

Materials

- Computers with internet access
- Reference management software (Mendeley, EndNote, or Zotero)
- Covidence systematic review management software
- Access to academic databases (PubMed/MEDLINE, Embase, Scopus, CINAHL, Web of Science, ERIC)
- Microsoft Word and Excel for data management

Description

1 Background and Rationale

Competency-based medical education (CBME) represents a paradigm shift from time-based to outcomes-based training, focusing on the acquisition and demonstration of specific competencies necessary for safe and effective healthcare practice. As healthcare education increasingly adopts competency-based approaches across distributed sites—including multi-campus medical schools, regional training programs, and networked education networks—ensuring consistent quality standards and rigorous assessment across all locations has become critically important.

Distributed healthcare education models offer significant benefits, including expanded training capacity, workforce development for underserved areas, and learner exposure to diverse practice settings. However, these models also introduce substantial quality assurance challenges. Maintaining equivalent educational quality across sites with varying resources, different patient populations, diverse faculty expertise, and distinct institutional cultures requires sophisticated quality assurance frameworks and assessment approaches.

Current quality assurance challenges in distributed competency-based education include:

- **Standardization vs. Contextualization Tension:** Balancing the need for consistent standards across sites while respecting local context and learning opportunities
- **Assessment Consistency:** Ensuring inter-rater reliability and assessment validity across different assessors, sites, and learning environments
- **Resource Variability:** Managing quality assurance when sites have different resources, technology infrastructure, and faculty expertise
- **Accreditation Compliance:** Meeting accreditation standards while operating across multiple distributed locations
- **Data Integration:** Collecting, analyzing, and using quality data from multiple sites to drive continuous improvement
- **Equity:** Ensuring all learners receive equivalent quality education regardless of training site

Despite the growth of distributed CBME programs globally and increasing recognition of these challenges, the quality assurance frameworks, standards, and assessment approaches used to address them remain poorly synthesized. Program leaders, accreditation bodies, and medical education researchers need evidence-based guidance on effective quality assurance strategies for distributed competency-based healthcare education.

1.1 Significance

This scoping review will address several critical knowledge gaps:

- For Program Leaders: Provide evidence-based quality assurance frameworks and practical strategies for ensuring consistent competency assessment across distributed sites
- For Accreditation Bodies: Inform standards development for distributed competency-based education programs, particularly regarding quality monitoring, assessment consistency, and inter-site comparability requirements.
- For Medical Education Researchers: Identify research gaps in quality assurance for distributed CBME and establish priorities for future investigation.
- For Technology Developers: Highlight technology needs and effective solutions for quality monitoring, data integration, and learning analytics in distributed settings
- For Learners: Ensure quality assurance approaches protect learner interests and promote equitable educational experiences across all sites.

Stage 1: Identify the Research Questions

2 Primary Research Question

- 2.1 What quality assurance frameworks, standards, and assessment approaches ensure consistent and effective competency-based healthcare education delivery across distributed sites?

3 Establish secondary research questions.

- 3.1 What specific quality standards and criteria are used to evaluate competency-based education programs across multiple sites?
- 3.2 How do distributed healthcare education networks ensure consistency in competency assessment while accommodating local contextual differences?
- 3.3 What role do entrustable professional activities (EPAs) and milestone-based assessments play in quality assurance across distributed sites?
- 3.4 What technology solutions and data systems support quality monitoring and continuous improvement in distributed competency-based education?

4 Set primary objective

- 4.1 To examine quality assurance frameworks and assessment approaches that ensure consistent, high-quality competency-based healthcare education across distributed sites.

5 **Define secondary objectives**

- 5.1 To identify and analyze quality assurance frameworks, standards, and accreditation requirements for distributed competency-based healthcare education.
- 5.2 To examine assessment methods and tools used to ensure consistent competency evaluation across multiple sites.
- 5.3 To explore the balance between standardization and contextualization in quality assurance approaches for distributed education.
- 5.4 To identify technology solutions and data analytics approaches that support quality monitoring and improvement in distributed settings.

Stage 2: Identify Relevant Studies

6 **Apply thePopulation, Concept, Context (PCC) Framework**

- 6.1 Population: Healthcare learners (medical students, nursing students, residents, fellows, other health professions students) and educators involved in competency-based education across distributed sites
- 6.2 Concept: Quality assurance frameworks, accreditation standards, assessment methods, competency evaluation, EPAs, milestones, standardization strategies, inter-site comparability measures, quality metrics and indicators, technology solutions for quality monitoring
- 6.3 Context: Distributed healthcare education systems, including multi-campus medical schools, regional training sites, distributed residency programs, networked health professions education, and competency-based medical education (CBME) programs

7 **Search Strategy Development**

- 7.1 Search databases:
 - PubMed/MEDLINE

- Embase
- Scopus
- CINAHL
- Web of Science
- ERIC (education-focused papers)
- Google Scholar (first 200 results)
- Grey literature sources (conference abstracts, theses, white papers, accreditation reports)

7.2 Set date range: 2015–2025
(10-year window to capture contemporary practices in competency-based education)

7.3 Apply language restriction: English only

8 Develop Search Terms

8.1 Quality Assurance Concepts:

- "quality assurance"
- "quality framework*"
- accreditation
- "assessment framework*"
- benchmarking
- certification
- validation
- "quality standards"
- "quality metrics"
- "quality indicators"
- "program evaluation"

8.2 Competency-Based Education Concepts:

- "competency-based education"
- CBE
- CBME
- "competency assessment"
- "EPA*" OR "entrustable professional activities"
- milestones
- "competency framework"
- "clinical competence"

8.3 Distributed Education Concepts:

- distributed
- "multi-site"

- "multiple sites"
- "satellite campus"
- "regional site"
- "distributed learning"
- "distributed training"
- networked

8.4 Primary Boolean Search String (PubMed/MEDLINE):

("quality assurance"[tiab] OR accreditation[tiab] OR "assessment framework"[tiab] OR benchmarking[tiab] OR "quality standards"[tiab] OR "program evaluation"[tiab])

AND

("competency-based education"[tiab] OR CBE[tiab] OR CBME[tiab] OR "competency assessment"[tiab] OR "EPA"[tiab] OR "entrustable professional activities"[tiab] OR milestones[tiab])

AND

(distributed[tiab] OR "multi-site"[tiab] OR "multiple sites"[tiab] OR "satellite campus"[tiab] OR "regional site"[tiab])

AND

(healthcare[tiab] OR "medical education"[tiab] OR "nursing education"[tiab] OR "health professions education"[tiab])

AND 2015:2025[pdat]

8.5 MeSH Terms:

- Quality Assurance, Health Care
- Clinical Competence
- Competency-Based Education
- Program Evaluation
- Educational Measurement
- Education, Medical
- Education, Nursing

8.6 Alternative Natural Language Search Query

Research on quality assurance systems, accreditation frameworks, and assessment approaches for competency-based healthcare education delivered across distributed sites. Focus on studies examining quality standards, evaluation frameworks, program monitoring, benchmarking strategies, and certification processes for ensuring consistent competency assessment across multiple training locations. Include frameworks for entrustable professional activities (EPAs) and milestone-based assessment in distributed medical and health professions education from 2015-2025.

Stage 3: Study Selection

9 Inclusion Criteria

- 9.1 Include studies that examine quality assurance frameworks, accreditation processes, or assessment approaches for competency-based education.
- 9.2 Include studies that describe quality standards, evaluation criteria, or monitoring systems used across multiple educational sites.
- 9.3 Include studies that explore EPAs, milestones, or other competency assessment methods in distributed settings.
- 9.4 Include studies that describe technology solutions, data systems, or analytics approaches for quality monitoring.
- 9.5 Include studies involving distributed healthcare education systems, including multi-campus programs, regional training sites, networked education, or satellite campuses
- 9.6 Include studies employing any research design (quantitative, qualitative, mixed-methods), as well as descriptive studies, program evaluations, and implementation reports.
- 9.7 Include grey literature sources such as conference abstracts, theses, white papers, accreditation reports, and program reviews if they provide sufficient methodological information.

10 Exclusion Criteria

- 10.1 Exclude studies focused solely on single-site education programs without distributed components
- 10.2 Exclude studies that do not address quality assurance, assessment, or evaluation aspects.
- 10.3 Exclude studies focused exclusively on non-competency-based curriculum models.
- 10.4 Exclude studies that are in a non-English language.

10.5 Exclude studies published before 2015

10.6 Exclude editorials, commentaries, and opinion pieces without empirical data or program descriptions.

11 Screening Process

11.1 All retrieved citations will be imported into Covidence systematic review management software.

11.2 Duplicate records will be removed using Covidence's automatic deduplication feature and manual review.

11.3 Two independent reviewers will screen titles and abstracts using predefined inclusion/exclusion criteria.

11.4 Conflicts will be resolved through discussion; if consensus cannot be reached, a third reviewer will make the final decision.

11.5 Full-text articles will be retrieved for all potentially relevant studies.

11.6 Two independent reviewers will conduct full-text screening using the same inclusion/exclusion criteria.

11.7 Reasons for excluding full text will be documented.

11.8 A PRISMA-ScR flow diagram will document the screening process and results.

Stage 4: Data Charting

12 Data Extraction Form Development

- 12.1 Develop the data extraction form by piloting five studies and identifying common variables relevant to quality assurance in distributed competency-based healthcare education.
- 12.2 Two independent reviewers will extract data; discrepancies will be resolved through discussion.

13 **Data Extraction Variables**

13.1 Study Identification and Design

- Study ID (unique identifier: Author-Year)
- Country/Region
- Study Design (quantitative, qualitative, mixed-methods, descriptive, evaluation)
- Study Aim/Objective
- Duration of study period
- Publication type (peer-reviewed journal, grey literature, report)

13.2 Educational Program Context

- Healthcare discipline(s) (medicine, nursing, pharmacy, allied health, interprofessional)
- Education level (undergraduate, graduate, residency, fellowship, continuing education)
- Number of distributed sites
- Geographic distribution (urban/rural/mixed, regional/national/international)
- Total number of learners
- Program size and structure
- Years of program operation

13.3 Quality Assurance Framework

- Quality framework(s) used (named frameworks or program-specific approaches)
- Quality standards and criteria
- Accreditation requirements and compliance mechanisms
- Benchmarking approaches
- Quality indicators and metrics
- Internal vs. external quality assurance mechanisms
- Frequency of quality reviews
- Responsible parties/governance for quality assurance

13.4 Assessment Methods and Tools

- Competency domains assessed (knowledge, skills, attitudes, behaviors, systems-based practice)
- Assessment methods (written exams, OSCEs, simulation, workplace-based assessment, portfolios, 360° evaluations)
- EPA implementation and assessment
- Milestone-based assessment approaches
- Standardized assessment tools and instruments
- Assessment frequency and timing
- Assessor training and calibration approaches
- Inter-rater reliability measures

13.5 Standardization and Consistency

- Standardization strategies across sites
- Curriculum alignment mechanisms
- Faculty development for consistent assessment
- Assessment calibration methods
- Inter-site comparability measures
- Quality control processes
- Balancing standardization with local adaptation
- Site equivalency evaluation methods

13.6 Technology and Data Systems

- Technology platforms for quality monitoring (LMS, assessment platforms, data dashboards)
- Data collection and management systems
- Learning analytics applications
- Real-time monitoring capabilities
- Data integration approaches
- Reporting mechanisms
- Dashboard and visualization tools
- Privacy and security considerations

13.7 Outcomes and Impact

- Quality outcomes reported (learner performance, program outcomes, accreditation results)
- Site comparison data
- Continuous improvement initiatives
- Stakeholder satisfaction
- Resource efficiency
- Challenges and barriers identified
- Success factors and facilitators



- Lessons learned and recommendations

13.8 Equity and Fairness

- Equity considerations in quality assurance
- Assessment bias mitigation strategies
- Resource distribution across sites
- Support for underserved sites
- Fairness in evaluation across contexts

Stage 5: Collate, Summarize, and Report Results

14 Data Synthesis Approach

- 14.1 Compile extracted data in structured tables organized by quality framework type, assessment approach, and technology solution
- 14.2 Analyze quantitative information descriptively (frequencies, percentages, ranges):
 - Number of studies by country, discipline, and education level
 - Types of quality frameworks employed
 - Assessment methods used across sites
 - Technology solutions implemented
 - Quality metrics and indicators reported
- 14.3 Conduct narrative synthesis organized by research questions:
 - Thematic analysis of quality assurance frameworks and standards
 - Patterns in assessment approaches for competency evaluation
 - Strategies for balancing standardization with local adaptation
 - Technology enablers for quality monitoring
 - Challenges and solutions for inter-site consistency
- 14.4 Create visual representations:
 - Geographic distribution of studies (world map)
 - Quality framework typology diagram
 - Assessment method frequency chart
 - Technology solution categories
 - Timeline of quality assurance evolution in distributed CBME
- 14.5 Synthesize findings by competency-based education framework:
 - CanMEDS roles
 - ACGME competencies
 - Nursing competencies
 - Other discipline-specific frameworks

14.6 Identify research gaps and future research priorities

Stage 6 (Optional): Conduct Stakeholder Consultation

15 **Engage relevant stakeholders involved in quality assurance for distributed healthcare education.**

15.1 Include participants such as:

- Accreditation body representatives
- Academic leaders from multi-campus programs
- Medical education researchers with quality assurance expertise
- Assessment specialists
- Learner representatives
- Faculty from distributed sites
- Quality improvement specialists
- Educational technology experts

15.2 Consultation methods:

- Virtual focus groups or advisory panel meetings
- Structured feedback on preliminary findings
- Validation of framework interpretations
- Input on practical implications and recommendations

16 **Dissemination**

16.1 Submit the final manuscript to a peer-reviewed journal specializing in medical education, healthcare education, or educational assessment.

16.2 Target journals: Academic Medicine, Medical Education, Medical Teacher, Perspectives on Medical Education, Assessment & Evaluation in Higher Education, JMIR Medical Education

16.3 Present key results at leading national and international conferences:

- Association of American Medical Colleges (AAMC) Annual Meeting
- Association for Medical Education in Europe (AMEE) Conference
- International Conference on Residency Education (ICRE)
- Ottawa Conference on Assessment
- Dubai Health Medical Education Conference
- Regional medical education conferences



- 16.4 Develop a policy brief for accreditation bodies and program leaders to inform their decision-making processes.
- 16.5 Create an infographic that summarizes the key findings for broader dissemination.

Estimated Time

- 17 Total Duration: 12 months
Months 1–3: Search strategy and database searching
Months 4–5: Study selection and screening
Months 6–7: Data extraction
Months 8–9: Data synthesis and analysis
Months 10–12: Manuscript preparation and dissemination

Key Innovation

- 18 This protocol presents the Standardization–Contextualization Framework, a new perspective for examining how distributed healthcare education programs manage the balance between maintaining consistent standards and adapting to local contexts. It allows for a structured analysis of quality assurance methods, ranging from complete standardization to full contextual adaptation.

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