

# How do we measure how we think? A scoping review on the measurement of clinical reasoning

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## **Background:**

Failures in reasoning have been linked to medical error, with significant impacts on patient safety.<sup>1-3</sup> This has emphasized the importance of effective clinical reasoning as a component of professional competence.<sup>4</sup> As with other competencies,<sup>5-6</sup> the development of competence in clinical reasoning must be supported by teaching, assessment, and if needed, remediation. However, the definition and observable characteristics of effective clinical reasoning processes have been underspecified, making clear communication particularly difficult.

## **Importance of topic:**

A review of the current medical education literature for measures of clinical reasoning could facilitate decision-making regarding assessment, teaching and remediation of clinical reasoning. The objective of this study is to broadly review this literature to identify the breadth of ways in which clinical reasoning has been operationalized in the context of both assessment and research.

## **Methods:**

Considering the breadth of ways clinical reasoning may be measured within medical education, we propose the application of a scoping review methodology. This methodology involves the use of rigorous methods to select, collect and summarize existing literature in broad thematic areas and allows for iterative and reflective interaction with findings<sup>7</sup>. *Identifying studies.* A research librarian will assist in developing search strategies for the main scholarly databases using MeSH terms and keywords relating to: clinical reasoning, diagnostic reasoning (including medical error), medical education, and measurement (sample in Table 1). *Study selection.* Original articles reporting a measure of clinical reasoning in medical education will be included. Research syntheses of existing evidence, reviews, commentaries and editorials will be excluded, but will be reviewed and hand-searched for relevant references. Two team members will review titles and abstracts for inclusion criteria, and the full text will be reviewed in cases of disagreement. *Data charting.* A data charting form will be developed, focusing on the following units of analysis: conceptual framework and quantifications of clinical reasoning (measures of observed outcome (e.g. diagnostic accuracy), measures of performance on an assessment (e.g. score on a key features test), or process-based assessments (e.g. measures of reflective process)). *Collating and reporting results.* Descriptive analysis will highlight the nature and distribution of studies (e.g. number of studies, study design, year of

publication, study population, methodology and area of practice (clinically (e.g. pediatrics) and level of practice (e.g., PGME)). We will conduct a thematic analysis to map the scope of measurements of clinical reasoning using the main units of analysis listed above.

### Importance of review to the practice of medical education

Clinical reasoning represents a multitude of processes key to the diagnosis and management of patients. As competency-based education moves closer to implementation, strong assessment strategies are needed. We hope that this review could function as a framework to summarize current work in the measurement of clinical reasoning and to propose ‘gaps’ in current practices.

### Feasibility

All authors have conducted research in clinical reasoning and are, therefore, familiar with the construct under review. KE is editor-in-chief of Medical Education, enabling a strong sense of the medical education literature. AT has conducted several scoping reviews and will provide strong methodological expertise.

### References:

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**Table 1:** Pilot search strategy for assessment of clinical reasoning in UGME (databases include: Ovid Medline, CINAHL, Ovid Psychinfo, ERIC, Scopus, and Google Scholar; studies in both French and English will be included).

Concept	MeSH headings	Keywords
<u>Clinical Reasoning</u>	clinical competence, choice behaviour, differential diagnosis, problem solving, decision making	clinical reasoning, (diagnos*adj10(uncertainty or reasoning)), cogni*adj3 error*, diagnos*adj3 error
<u>UGME</u>	Educational Medical Undergraduate, Educational Medical, Students Medical	medical student, (undergraduat* adj3 medic*)
<u>Measurement</u>	Educational measurement	evaluat*, assess*, rating*, rate*, measure*, accuracy, response time, RT, plan, map, test*

Note: Studies must include one search dimension from each concept to be included in the review. Concept 2 will be adapted and defined as appropriate.