

## 8. Assessment

### A White Paper prepared for the Royal College of Physicians and Surgeons of Canada, Future of Medical Education in Canada

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#### Summary of Key Points

- In-training assessment should become the dominant method of determining competence, with formative assessment taking priority over summative assessment.
- While theoretically sound, the operational deployment of the In-Training Evaluation Report (ITER) is seriously flawed in that it is rarely populated with reliable or objective data, allows faculty to focus on restricted performance domains, and is often completed long after the training experience has ended.
- With assessment heavily weighted towards the Medical Expert role, relatively little assessment is based on well-documented supervision or observation in a real working environment that concentrates on the more global skills that define competence.
- Instead of a one-time final test of overall competence, Royal College examinations should form one part of the overall assessment, better integrated into the learning experience and administered iteratively over the course of training.
- Movement towards a competency-based model for medical education appears both necessary and desirable, carrying with it the demand for a complementary system of competency-based medical assessment
- Valid and reliable assessment of complex competencies is highly dependent on having multiple independent observations of performance from a large number of observers, the majority of which should be within a real practice setting

#### Summary of Recommendations

1. The Royal College should direct significant attention and resources towards improving postgraduate assessment. The major focus of this initiative would be in-

training assessment, structured in such a way as to support a goal of competence-by-design for Canadian residency training programs.

2. The Royal College should recruit and support a national network of experts in education, charged with designing a comprehensive, practical postgraduate assessment framework. This framework would include both a menu of specialty-adaptable assessment methodologies as well as a portfolio-based system for individual documentation and ultimately credentialing.
3. The Royal College should re-examine the nature and timing of its certifying examinations, in particular their impact on learning and remediation.
4. The Royal College should explore avenues for better integrating undergraduate, postgraduate and continued professional development, in terms of both training and assessment. To this end, the Royal College would initiate a process of consultation and discussion among the various stakeholders including the CFPC and universities.
5. The Royal College should take into consideration the challenges faced by internationally-trained physicians in order to ensure that a new model of assessment is suited to their unique background, while also measuring their true level of competence.

## 8. Évaluation

Livre blanc préparé pour le Collège royal des médecins et chirurgiens du Canada:  
L'avenir de l'éducation médicale au Canada

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### Sommaire des principaux enjeux

- L'évaluation pendant la formation devrait être considérée comme la principale méthode pour définir la compétence, l'évaluation formative ayant priorité sur l'évaluation sommative.
- Le déploiement fonctionnel des fiches d'évaluation en fin de formation (FEFF), bien qu'éprouvé en théorie, présente cependant une faille dans le fait que celles-ci sont rarement basées sur des données fiables et objectives. Ce déploiement permet aux membres du corps professoral de se centrer sur des domaines où le rendement est restreint et il se termine souvent longtemps après la fin de l'expérience de formation.
- Fortement axée sur le rôle de l'expert médical, l'évaluation est très peu fondée sur une supervision bien documentée ou sur l'observation dans un véritable environnement de travail et se concentre sur les aptitudes plus générales qui définissent la compétence.
- Plutôt que de constituer un test final unique sur l'ensemble des compétences, les examens du Collège royal devraient faire partie d'une section seulement de l'évaluation globale; ils devraient être intégrés dans l'expérience d'apprentissage et être administrés itérativement pendant toute la formation.
- La tendance vers un modèle basé sur les compétences dans l'éducation médicale semble nécessaire et souhaitable. Ce modèle exige cependant un système complémentaire d'évaluations médicales fondées sur les compétences.

- Une évaluation valide et fiable de compétences complexes dépend grandement d'observations indépendantes multiples des rendements par un grand nombre d'observateurs, dont la majorité devrait être recueillie dans un milieu de travail réel.

### Sommaire des recommandations

1. Le Collège royal devrait porter une attention particulière à l'amélioration de l'évaluation postdoctorale et y accorder des ressources. Cette initiative devrait être centrée principalement sur l'évaluation pendant la formation et structurée de sorte à appuyer un objectif de « compétence par conception » pour les programmes canadiens de formation des résidents.
2. Le Collège royal devrait recruter et appuyer un réseau national d'experts en éducation qui s'occuperaient de concevoir un cadre d'évaluation postdoctorale exhaustif et pratique. Ce cadre comprendrait un ensemble de méthodologies qu'il serait possible d'adapter à l'évaluation des spécialités ainsi qu'un système basé sur le portfolio pour une documentation individuelle et ultimement pour l'examen des titres.
3. Le Collège royal devrait procéder à un nouvel examen de la nature et du moment des examens de certification, en particulier de leurs effets sur l'apprentissage et la remédiation.
4. Le Collège royal devrait étudier différentes avenues pour mieux intégrer le développement professionnel prédoctoral, postdoctoral et continu en ce qui concerne la formation et l'évaluation. Pour y parvenir, le Collège royal pourrait mettre en place un processus de consultation et de discussion parmi les différents intervenants, y compris le CMFC et les universités.
5. Le Collège royal devrait prendre en considération les défis auxquels doivent faire face les médecins formés à l'étranger pour s'assurer que le nouveau modèle d'évaluation tienne compte de leur contexte particulier tout en mesurant leur niveau réel de compétences.

# Assessment

## Introduction

This white paper is a broad-strokes analysis of assessment policy and practice, as viewed through the lens of Canadian postgraduate medical education. Its intent is to stimulate discussion, inform Royal College decision-making and provide the groundwork for an evolution of Canadian postgraduate medical assessment that is practical and flexible, reflective of current best practices, and capable of responding to societal health needs well into the 21<sup>st</sup> century.

While the primary focus of this white paper series is the collected specialty and subspecialty training programs under jurisdiction of the Royal College, it must be acknowledged from the outset that medical education is by nature a continuum, spanning undergraduate, postgraduate and (in-practice) continuing professional development. As such, postgraduate training and assessment cannot be addressed in isolation. Nor must the end of postgraduate training, as marked by the national certification examination, be considered the pinnacle of competence, but rather a waypoint in a career-long continuum. By inference, any observations and recommendations arising from this paper have direct and tangential implications for the breadth of medical education and assessment. Indeed, it might well be argued that, implemented in isolation, any new system of postgraduate assessment will fail to meet its full potential.

In addition, it must be embraced that competence, as required of a medical professional, is defined by more than simply the sum of an individual's knowledge and technical skills. Through development of the CanMEDS competency framework,<sup>1</sup> a measure of success has already been achieved in identifying the different roles that define the competent practicing physician. The challenge remains to find a complementary assessment framework that integrates the diverse values implicit in CanMEDS, while at the same time motivating the authentic assessment of competence, supporting decisions regarding promotion or certification, and capturing the essence of competent clinical practice.

In concert with other papers in this series, this document recognizes key strengths and weaknesses in the existing system of postgraduate assessment, in the process challenging practices that are outdated or ineffective, while justifying and supporting those that work

well. Although a comprehensive and specific examination of the assessment literature is impractical in the context of a brief review, evolving trends and methodologies are identified. Finally, recommendations for change are offered, with an emphasis on assessment policy over the more granular implementation of specific assessment methodologies.

## Background

Canada's system of postgraduate medical education for specialists comprises more than six hundred training programs in sixty-six specialty and subspecialty disciplines, administered through seventeen Canadian universities, under the jurisdiction of the Royal College. Beyond the specialist domain, dozens of Family Medicine training programs are administered in a parallel fashion by the College of Family Physicians of Canada (CFPC). While the Royal College embraces many mandates, foremost among these is the commitment to ensure the highest standards of postgraduate education, and implicitly the competence of Canada's specialist physicians, to the benefit of the general public. Arguably, our professional autonomy hinges on the Royal College's ability to demonstrate this competence both in certification and in practice.

Individual training programs operate under shared Objectives of Training and Standards of Accreditation, overseen by the Specialty Committees, universities and Royal College. There is, however, a great deal of inter-site and inter-disciplinary variation in how these objectives and standards are applied, particularly with respect to in-training assessment.

The In-Training Assessment Report (ITER), mandated by the Royal College and structured to reflect the CanMEDS framework, serves as the assessment backbone for all Royal College programs. While theoretically sound, the operational deployment of the ITER is seriously flawed in that it (among other things) is rarely populated with reliable or objective data, allows faculty to focus on restricted performance domains, and is often completed long after the training experience has ended.<sup>2</sup> Furthermore, it has been suggested that the structure of the ITER may actually lead to a distorted view among faculty and learners of the CanMEDS roles, masking their integrated nature and holistic philosophy.<sup>3</sup> As a result, one is forced to question its reliability and validity as a tool for formative development, a benchmark for promotion or (through the summative Final In-Training Evaluation Report, or FITER) as a contributor to credentialing or certification decisions.

While the majority of Royal College programs do employ some form of structured (written and/or oral) in-training examinations, assessment is heavily weighted towards the Medical Expert role.<sup>4</sup> Unfortunately, relatively little assessment is based on well-documented supervision or observation in a real working environment. In an effort to bridge assessment gaps, programs frequently and misguidedly employ surrogates of competence, such as a demonstrated facility in presenting rounds being equated with an ability to communicate effectively with patients.

Canada's Program Directors (PDs) are by and large aware of these deficiencies, and have expressed the desire for a more robust, practical and preferably shared national framework for assessment.<sup>5</sup> However, most PDs, though clearly dedicated clinicians and teachers, have neither the time nor the expertise to independently identify and develop the necessary tools.

The Royal College, while highly prescriptive through its standards of accreditation, has been relatively less supportive of practical national initiatives on in-training assessment, providing guidelines<sup>6</sup> but little practical support in their implementation. Instead, the resources of the Royal College are heavily concentrated on the annual production and psychometric evaluation of centralized, terminal examinations. Though clearly not without value, these examinations, like much in-training assessment, focus primarily on the lowest level of Miller's pyramid (i.e. knowledge), rather than the more complex competencies required of a practicing physician. With these examinations positioned near the end of training, they are of virtually no formative value, offer only scant remedial direction to unsuccessful candidates, and are incongruent with the idea of competence as a continuum. Worse, by redirecting the efforts of senior residents, high-stakes terminal examinations may actually have a negative impact on exposure to and attainment of higher order competencies in the final year of training. Finally, studies comparing certifying examination performance and practice outcomes are few in number and at best show only modest correlations.<sup>7,8,9</sup>

## Drivers for change

Given its commitment to 'improving the health of Canadians by setting the highest standards for specialty medical education,'<sup>10</sup> it is incumbent on the Royal College to ensure that its educational policies and programs are reflective of current knowledge and best educational practices.

Though successful in realigning training objectives and accreditation standards to reflect the CanMEDS framework, training programs under the Royal College's jurisdiction have been slow to implement a robust, parallel structure capable of assessing these diverse yet ultimately integrated competencies. A narrow and often disproportionate focus on the Medical Expert role persists despite evidence to suggest that major determinants of ongoing competence lie elsewhere.

While arguably paramount, societal demands for increased accountability regarding specialist competence must be balanced against the need for efficient use of training time and resources. Implicit in this is the mandate that assessment be continuous and broad, and that it benchmark competence and identify any need for learner remediation in a timely fashion. Movement towards a competency-based model for medical education appears both necessary and desirable, carrying with it the demand for a complementary system of competency-based medical assessment.<sup>11,12</sup>

Since the 1990's, national physician resource deficits have combined with an effective globalization of postgraduate medical education to dramatically shift the landscape for specialist certification in Canada. Unlike the essentially linear, single-stream model of the past, learners now enter, leave and re-enter our postgraduate system at many points along the continuum, often carrying with them qualifications from outside the country. Increasingly, specialist physicians trained outside the Canadian system are seeking validation of their training in order to obtain employment. Provincial health authorities, seeking to fill vacancies, are rightly adding their own leverage to these demands. While not insensitive to these changes, the Royal College has been reactive rather than proactive in its response, and currently lacks the infrastructure to adequately manage them.

Although the primary goal in assessing any physician specialist must be the determination of competence for practice, it is essential that in the case of foreign-trained physicians, the

assessment methods take into account an inevitable diversity of knowledge, experience, skills, language and cultural values. As a stand-alone entity, our system of terminal examinations does this poorly. Worse, there exists at least circumstantial evidence to suggest that our examinations disadvantage candidates of different cultural backgrounds, even though these factors may have little importance for the competent practice of medicine. It remains the responsibility of the Royal College, both to itself and to the Canadian public, to modernize its system of assessment, ensuring that any new framework is robust, and adaptable while maintaining high national standards for certification. However, the window for action may be narrow. Only by championing a robust and flexible assessment framework can the Royal College avoid being relegated to the sidelines.

### **Possible solutions**

It is incumbent on the Royal College that the type, scope, frequency and timing of assessment be such as to ensure the competency of every certificant. A competency-based assessment (CBA) model meets this requirement regardless of the chosen training model (time vs. competency based vs. hybrid). The characteristics of CBA have recently been well reviewed by Holmboe et al.<sup>12</sup> The following are some general principles under which such a framework might be established:

***In-training assessment must become the dominant method of determining competence.*** Performance in the workplace reflects the pinnacle of performance hierarchies and as such carries the greatest validity and relevance. The clinical/workplace milieu is appropriate to the assessment of all the CanMEDS roles and arguably the only one in which roles such as Professional, Collaborator and Communicator can be authentically assessed.

***Competence must be defined in pragmatic and operational terms for all situations.***

While the CanMEDS framework provides clear reflection on the essence of competence, the greater challenge will be to implement an assessment framework that captures the integrated nature of the CanMEDS roles in practice. Systems such as the current ITER, by identifying these roles in isolation, risk losing validity from the learner's perspective and may ultimately prove to be less than the sum of their parts. In-training assessment should therefore be based around real clinical work that reflects the important professional activities of the specialty. Different activities draw variously on the CanMEDS roles, but

within any specialty, the full range of these roles will be reflected in the scope of professional work done by its practitioners. The challenge is to enable assessment to be guided by CanMEDS but not constrained by it. Grounding assessment in real clinical work can help to maintain this precarious balance.

***Assessment must become more learner-driven, learner-focused and formative.***

Formative assessment should take priority over summative assessment. It is nearly continuous and fully integrated into all aspects of clinical teaching and supervision. Feedback, reflection and guided self-assessment are essential to this modality. Simple but effective documentation will be one of the keys to success – its relative absence is one of the major weaknesses in our current system and practices. As the quantity and quality of formative information grows, the demand for and reliance on summative methods is further diminished.

***Effective means for providing timely constructive feedback, both occasional and recurrent, must be found and incorporated within the framework.***

Early identification of the learner experiencing difficulty is both an advantage and a responsibility of this approach. Implicit in this is the requirement that opportunities for remediation be provided, and that effective mechanisms exist for terminating training in the event of repeated unsuccessful attempts.

***Assessment methodologies must be improved and of greater variety.*** Methods should be chosen to reflect the competencies identified, rather than the converse. Similarly, assessment is described in terms of these competencies, not the tools employed. While developing new tools and methods of assessment may be unnecessary, finding better ways to apply existing ones is required. It has long been observed that the myth that test format determines what is tested has been very damaging to progress in the assessment of competence. What is measured depends much more on the stimulus used for a test (the content given and the task to be done) than on the response or test format.<sup>13</sup>

***Multiple observers or points of view must ideally be incorporated.*** This may include the perspectives of supervisors, medical or administrative staff, other learners, patients and families. The resulting assessment will be more meaningful, less physician-centered, and more in line with societal needs. Selected workplace assessment may be performed 'backstage', with the learner unaware, thus mitigating any Hawthorne effect while reflecting

additional dimensions of performance. Valid and reliable assessment of complex competencies is highly dependent on having multiple independent observations of performance from a large number of observers. This is easier to achieve in our clinical context when the observations can be brief and simple. In the future, we will base decisions about competence far less on highly structured occasional assessments, and much more on the aggregates of multiple assessments in multiple contexts by multiple observers over a continuum of time in workplace settings. This aggregation will be done on a defined regular basis, using a defined methodology, by a designated individual or committee charged with making decisions on progress.

***Qualitative methodologies and narrative information will play a much greater role in assessment.*** While quantitative measures will always have an essential role to play in assessing competence, they alone are far from sufficient to meet the challenges of the future. Qualitative and narrative data is often much more appropriate for true competency-based assessment, and tends to generate useful data more easily in the workplace setting; it has also been shown to be a better predictor of overall and long-term competence than most of the available quantitative data. This will require a paradigm shift to our general way of thinking about, doing, and reporting our assessment activities. The key to success will be to maintain a balance between qualitative and quantitative methodologies, with each occupying its useful place, one complementing the other.

***Centralized examinations should no longer necessarily be end-of-training exams.*** Instead of trying to be a one-time final test of overall competence (which has never really been possible), centralized examinations should form one part of the overall assessment, better integrated into the learning experience and administered iteratively over the course of training. They should concentrate on what can be well tested in a centralized format, and so complement in-training assessments, and no longer try to repeat or replace or compensate for them.

***Success, either at various stages of training or at the time of certification, should be determined by having demonstrated a competent performance on each of required components.*** It should no longer be determined by average or combined performances – a weak performance in a key area of competence should preclude success until competence in that area has been achieved and demonstrated.

## How will choices be made and justified?

Any changes to a system of assessment will need to be justifiable, and it is not just a question of validity and reliability, though these are obviously very important. The most commonly used approach at this time is a Utility index model proposed by Van der Vleuten.<sup>14</sup> He identified five factors that must be considered, and the overall utility is the product of the five factors, modulated by their relative importance to the assessment situation. The factors to be considered are

1. *Validity (V)*
2. *Reliability (R)*
3. *Educational Impact (on learning and learners) (E)*
4. *Acceptability (to learners, to assessors, to society) (A)*
5. *Cost effectiveness (material and human resources) (C)*

The Utility index (U) is a product,  $U = V \times R \times E \times A \times C$ , so a weakness in any one alone will greatly affect the usefulness of a system of assessment. The most valid and reliable assessment program will not be useful if it is not acceptable;<sup>15</sup> cost is always a factor to be considered; a well designed assessment system should drive learning towards real competence and be perceived positively by learners; it should no longer be viewed mainly as an examination that has little to do with real competence, but needs to be studied for and passed, and then forgotten.

Using such an index to help us make choices concerning the priorities for assessment and the methods to be used will be the key to success as we match our future assessments to the needs.

## Internationally-trained physicians

Internationally-trained specialists and learners need to be able to access our system of assessment so that they may seek certification according to national standards of competence. These individuals present three particular challenges from an assessment point of view:

1. Many of these will be experienced practitioners, who are actively in practice but also many years removed from training, so while they may be very competent to practice

their discipline or specialty, they may well have difficulty in succeeding in our current centralized end-of-training examinations.

2. Access to these examinations will also be more difficult for this group, as they evolve in the directions suggested above.
3. There will be no available useful in-training evaluations, even though this will become a much more important part of the certification process and decisions.

The solutions to these difficulties remain to be found but will likely be based in at least the following:

1. An extended period of assessable and assessed clinical practice will be required to obtain valid and reliable information on the important components of competence that can only be assessed in this context. Attempts at replacing this requirement with centralized and standardized out-of-context testing are not likely to pass the Utility index test.
2. There need to be found alternatives to the centralized examinations that will assess the required competencies to the same national standard, but use different and equivalent methods.
3. An evolution of the centralized assessments towards true measures of competence to practice, as opposed to training program objectives.

### **Basic requirements for success in implementation**

In order to implement any or all of the above initiatives, it will require specific action on behalf of the Royal College, potentially including the following:

- A new allocation or shift of emphasis and resources, away from the centralized terminal examination system, and towards a more robust system of in-training assessment.
- Development of a shared national framework (toolbox) for assessment, supported by the Royal College and adapted / disseminated to specific training programs via the existing network of Specialty Committees.
- Establishment and support of a Royal College-led network of educational/assessment experts, acting as a resource to specialty committees and individual programs,

guiding selection, adaptation and implementation of specific assessment modalities within the new framework.

- Development and support of a practical repository, under which the experiences and assessment components of individual learners might be compiled. This might best be envisioned as an online portfolio, incorporating both formative and summative assessment, and supporting valid decisions regarding learner promotion and/or certification. Ideally, the chosen format would integrate well with an undergraduate and in-practice portfolio, thus providing greater continuity in personal/professional development over the career of the individual.
- De-emphasis and/or replacement of the current system of ITERs as the benchmark for promotion and (via the FITER) promotion, in favor of periodic progress reports based on the learner's cumulative portfolio.
- Close and formal collaboration between the national assessment bodies (Royal College, CFPC, CMQ, MCC) and the MRA's will be essential to success at meeting the assessment and certification needs of practicing international physicians.

### **Barriers to change**

As outlined in the introduction and background to this White Paper, Canadian postgraduate medical training is a complex network, overseen by three colleges and delivered by hundreds of individual programs nationwide. Each of these programs has its peculiar circumstances, challenges and resources. Major systemic changes therefore demand wide consultation, are resource-intensive and tend to occur slowly. Should these changes also impact or seek to integrate with undergraduate or continuing professional education, the complexities multiply considerably. Even if restricted to the domain of postgraduate medical education, major changes to the assessment model will require the support not only of the Royal College, but also the CFPC, the Faculties of Medicine, specialty committees and programs.

When considering time and resource allocation, there exists a disproportionate emphasis on the terminal certifying examination throughout the postgraduate system. While the Royal College certifying examinations have evolved to an exceptionally high standard, in-training

assessment has remained comparatively stagnant. The Royal College has, through better accreditation standards and some limited educational initiatives, identified to training programs the need for more diverse and robust in-training assessment; however, relatively little has been done to support their development. Residency Program Committees (RPCs), meanwhile, have come to understand the need for better in-training assessment, but lack the resources or expertise to proceed effectively. Contributing to this is the reality that university support and recognition for teaching continues to lag behind that which is allocated for research or clinical care. Incentives to recruit, engage and retain experienced educators are in many cases lacking. As a result, most Program Directors and RPCs remain insufficiently resourced in terms of time and expertise to independently implement major changes in assessment philosophy or methodology.

Any new framework for assessment must take into account the dual role Canadian residents play as both learners and service providers, recognizing and respecting the overarching goals of public service and patient safety implicit in this model. More so than at any other time in history, resident duty hours and their impact on education are under a microscope. While evolving time constraints may not, in reality, be a barrier to change, the challenge will be to find efficient, integrated processes for in-training assessment, while simultaneously strengthening our definitions of competency. For their part, funding agencies and programs will need to find flexibility in dealing with those residents who have not yet achieved competence for independent practice within the prescribed timeframe.

Assessment methodology may actually pose the least significant barrier to change. Suitable methods already exist to assess virtually all dimensions of medical competence, though most have yet to be adopted by Canadian residency programs. Existing habits and methods remain deeply ingrained, and incumbent in this the philosophy that Medical Expert is the only worthy focus. In addition to lacking scope, assessment methods are often either insufficiently discriminating or administered too late in training to have meaningful impact on learner remediation. Few faculty or learners have experience or comfort with cutting-edge assessment methodologies. Clearly, an extensive support network for faculty development and learner orientation would be required to effect change.

The initial challenge in redrawing the map of postgraduate assessment will lie in identifying which of the broader CanMEDS competencies deserve the greatest attention, and with what degree of granularity. Guidance and expertise in adapting known and effective methods to

specific circumstances will be required. The assessment of complex competencies, such as the nature of effective teamwork, may require further specific study and development. Ultimately, success lies in constructing a shared yet adaptable postgraduate framework that embraces the timely, efficient use of valid assessment methodologies. Real-time, rationally selective observation and documentation of learner performance within the clinical environment could form the backbone of such a system, reinforced by simulation and specific tests of knowledge as indicated.

From the postgraduate (and potentially CPD) perspective, the Royal College is well situated to direct the development of an overarching assessment framework, as well as support, in a top-down fashion, the identification, adaptation and support of its component methodologies. Ideally, one might envision a network of educational experts, funded by the Royal College and charged with system design. These experts would also collaborate with specialty / subspecialty committees in choosing and adapting specific assessment tools, with universities in faculty development, and with individual programs concerning implementation.

### **Potential benefits**

- Higher standards of public service and patient safety through assured and ongoing professional competence, defined in the broadest possible terms.
- Better matching of physician training and output to societal needs, and more efficient use of resources to achieve this result
- Better longitudinal integration of assessment, documented competence and continued professional education from undergraduate through postgraduate and in-practice.
- More precise and timely identification of learners in difficulty, thus better facilitating their remediation.

## Recommendations

1. The Royal College should direct significant attention and resources towards improving postgraduate assessment. The major focus of this initiative would be in-training assessment, structured in such a way as to support a goal of competence-by-design for Canadian residency training programs.
2. The Royal College should recruit and support a national network of experts in education, charged with designing a comprehensive, practical postgraduate assessment framework. This framework would include both a menu of specialty-adaptable assessment methodologies as well as a portfolio-based system for individual documentation and ultimately credentialing.
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