The Role of EPAs in Creating a National System of Time-Variable Competency-Based Medical Education

Jolanta Karpinski, MD, and Jason R. Frank, MD

Abstract

Entrustable professional activities (EPAs) have emerged as a meaningful framework for achieving competency-based medical education (CBME). However, little is known about how to adapt EPAs to large-scale, multispecialty, system-wide implementations. The authors describe the design and experience of creating such a system based on EPAs and the Van Melle Core Components Framework for all accredited training programs under the auspices of the Royal College of Physicians and Surgeons of Canada. The resulting design is a unique configuration and use of EPAs, called Royal College EPAs. Others looking to implement EPAs for large-scale health professions education systems may want to consider this design approach.

The Royal College of Physicians and Surgeons of Canada oversees the standards for and quality of residency education in 67 specialty and subspecialty disciplines. Residency programs are based in academic health science centers that must be affiliated with a university faculty of medicine and overseen by a residency education dean. Since 1990, the Royal College has embarked on a deliberate path of evolving this system toward competency-based time-variable medical education (CBTV).

In 1996, the Royal College adopted the CanMEDS competency framework to define the necessary competencies for all areas of practice and provide a comprehensive foundation for medical education and practice in Canada. CanMEDS is now used in about 50 jurisdictions around the world. However, despite the efforts and resources expended in supporting implementation of CanMEDS, there are challenges at the teacher–learner interface, as there would be with the use of any framework made of many competencies. Trainees and teachers, while expressing support for the general ideas of the CanMEDS competencies, describe difficulty remembering all the required competencies and adapting them to specific problems and specialty practice at the bedside.

This challenge necessitated an approach to deploying the CanMEDS competencies into the medical workplace in a way that was easy to remember, had high face validity and relevance for teachers and learners, provided a meaningful assessment framework, and was fundamentally embedded in the everyday work and patient care provided by a given specialty community. In addition, at the Royal College, we were seeking a method to enable time-variable training and all aspects of Van Melle’s Core Components of CBME. We adapted the concept of entrustable professional activities (EPAs) developed by ten Cate and Scheele to serve as this essential design element.

EPAs, Time-Variable Training, and the Core Components of CBME

While there are many definitions, uses, and descriptions of EPAs, a commonly accepted definition is provided by ten Cate and Taylor: an EPA is “a unit of professional practice that can be fully entrusted to a trainee once he or she has demonstrated the necessary competence to execute this activity unsupervised.” It is generally accepted that EPAs are embedded in the real clinical work of a specialty, convey a standard in terms of the level of competence a learner needs to demonstrate to be entrusted, and include one or more competencies that a learner must acquire to perform a given EPA. In the Royal College CBME model of residency education, EPAs are a structural element for curriculum design, teaching, assessment, and resident progression and promotion.

Time-variable training was an explicit design goal of our new system. Time variability in training reflects an orientation to mastery learning and, by definition, a movement away from fixed time in professional education. Combined with CBME, this approach is called competency-based, time-variable education. The essential driver is a desire to ensure graduates can display all required abilities, with time as a resource rather than the organizing framework. Entrustment is a powerful educational mechanism for determining when a trainee can progress to the next level within a given phase of training or advance to the next stage. EPAs therefore enable CBTV designs.

Van Melle’s Core Components of CBME describe how entrustment and time variability relate to an overall approach to competency-based education. The 5 Core Components are an outcomes competency framework, sequenced progression, tailored learning experiences, competency-focused instruction, and programmatic assessment. We have adapted the concept of EPAs to assist with the implementation of these components in our CBME design; EPAs in this design are called Royal College EPAs (RC-EPAs).

- Outcomes competency framework.
- RC-EPAs use the CanMEDS 2015 framework to identify the distinct competencies applied in the performance of the tasks of the discipline.
• **Sequenced progression.** Through their training, residents progress from novice to expert. RC-EPAs are designed to facilitate that developmental progression, beginning with smaller or simpler units of entrustable tasks in the early transition to residency and culminating in larger, complex professional tasks before entry to practice.

• **Competency-focused instruction.** RC-EPAs are authentic tasks of the discipline, used at the learner–patient interface in daily clinical activities. In the context of ongoing patient care, teachers supervise residents and make observations about their knowledge, behavior, and skills. The resident’s performance with a particular RC-EPA is designed to be a prompt and scaffold for the supervisor to engage in a coaching conversation, identifying competencies for further improvement within the sequence of training.

• **Programmatic assessment.** RC-EPAs contribute to the program of assessment, providing information about a resident’s performance on a variety of clinical tasks. Supervisors record their observations of a resident’s performance with an RC-EPA, their assessment of the resident’s performance (using an entrustment scale), and the comments they provided in the coaching conversation. The records of these individual observations are collated and synthesized by a group, the competence committee, charged with making meaning of the totality of resident performance information. Observations of RC-EPAs form a basis for recommendations about the resident’s competence and progress toward certification.

### Anatomy of an RC-EPA

Having selected the concept of EPAs for the new CBME curriculum, we sought a method that would delineate the key professional activities within the practice of a given specialty or subspecialty, align the CanMEDS framework with that practice, and then sequence EPAs in a developmental manner to facilitate recommendations about resident progress within training on the basis of supervisor observation and entrustment.

Each RC-EPA has a title, key features, assessment plan, and associated milestones (Table 1). The title of the RC-EPA is a brief description of the professional activity, meant to quickly indicate the task to the supervisor and learner. The key features are intended to orient the supervisor and learner to the main purpose of the professional activity by providing a quick summary of the various elements that make up the task. The key features often include information about or examples of the range of the professional activity, such as different patient presentations or various clinical settings in which the task may present itself. The key features may also include important information about the parameters for the observation or assessment of the RC-EPA.

The assessment plan serves several purposes. It identifies who will assess the resident’s performance, how that performance will be observed, and the recommended form that should be used to record that observation. Information on the standard of performance to be achieved does not need to be included in RC-EPAs as each RC-EPA is written at the level that must be demonstrated by the resident without supervision. The assessment plan also conveys the breadth of information that a competence committee, tasked with making summative entrustment and advancement decisions, will need to make decisions about RC-EPA achievement. The breadth of information needed to entrust the RC-EPA refers to the range of cases, settings, and/or presentations in which practitioners in the discipline may perform this task. The assessment plan translates this description of the range of cases, settings, and/or presentations into a series of “context menus” consisting of drop-down lists, tick boxes, or write-in options that enable the supervisor to quickly record the situation in which the RC-EPA was observed.

Milestones, in the Royal College vernacular, are defined as observable markers of an individual’s ability along a developmental continuum of competencies. RC-EPAs include a selection of priority milestones that would be applied in the performance of that professional activity. As RC-EPAs are authentic tasks of the discipline, the milestones linked to that EPA provide an outline for understanding the competencies required to accomplish that task. By connecting the task with the CanMEDS framework, the milestones selected for the EPA make explicit the manner in which the CanMEDS roles are used in practice. Specialty committees are guided to select or write no more than 8–10 of the competencies most relevant to that task, across multiple domains of competence. The committees transform these generic competencies into milestones by writing them to be developmentally appropriate for the stage of training in question, providing a scaffold for teaching, learning, and assessment. Learners and curriculum developers can use this selection of competencies to identify the skills to be attained for that stage of residency. Within the context of an EPA observation, milestones are presented to the supervisor to prompt them to provide feedback and to guide their coaching of the learner’s performance.

### Unique Features and Strengths of the Royal College’s Approach to EPAs

RC-EPAs differ from the EPAs developed by other professional bodies in several important ways (Table 2). RC-EPAs can be thought of as developmental EPAs, rather than terminal or aspirational EPAs. This taxonomy describes how the various

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>In their totality, the RC-EPAs of a discipline describe its scope of practice</td>
</tr>
<tr>
<td><strong>Key features</strong></td>
<td>Orient learner and teacher to the task; may include information on the requirements for observation and assessment (e.g., setting)</td>
</tr>
<tr>
<td><strong>Assessment plan</strong></td>
<td>• Parameters that describe the breadth of cases, settings, and/or presentations in which this task is performed in this discipline • Guidance for competence committees in decisions about resident progression</td>
</tr>
<tr>
<td><strong>Milestones</strong></td>
<td>• Skills to be applied in the performance of this task, relevant CanMEDS competencies for that task • Used by learner and curriculum developers to identify the skills to be attained • Used by supervisors/observers to prompt/guide feedback to learner</td>
</tr>
</tbody>
</table>
Table 2
Comparative Features of Different EPA Designs and Their Use in Training

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Developmental EPAs</th>
<th>Terminal EPAs</th>
<th>Aspirational EPAs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description of EPA design</td>
<td>• Target desired patient outcomes</td>
<td>• Target desired patient outcomes</td>
<td>• Target desired patient outcomes</td>
</tr>
<tr>
<td></td>
<td>• Entrusted before progression to the next stage of training; totality of the EPAs</td>
<td>• Entrusted by the completion of training</td>
<td>• Desirable but not necessarily entrusted before completion of training</td>
</tr>
<tr>
<td></td>
<td>is entrusted before completion of training</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number and breadth</td>
<td>• Specific or broad</td>
<td>• Broad</td>
<td>• Broad</td>
</tr>
<tr>
<td></td>
<td>• Small number per stage</td>
<td>• Small in overall number</td>
<td>• Small in overall number</td>
</tr>
<tr>
<td></td>
<td>• Larger number overall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Link to outcomes competency</td>
<td>• Mapped to domains of competence</td>
<td>• Mapped to domains of competence</td>
<td>• Mapped to domains of competence</td>
</tr>
<tr>
<td>framework</td>
<td>• Expressed as competencies specific for that stage of training</td>
<td>• May be mapped to terminal competencies or a developmental progression of</td>
<td>• Mapped to a developmental progression of competencies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>competencies</td>
<td></td>
</tr>
<tr>
<td>Sequenced progression</td>
<td>Progression from one set of EPAs to another set with greater complexity and</td>
<td>Progression along supervision/entrustment scale throughout training</td>
<td>Progression along individual competencies mapped to the EPA throughout training</td>
</tr>
<tr>
<td></td>
<td>responsibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competency-based instruction</td>
<td>Used at point of care and supervision</td>
<td>Used as a curricular component</td>
<td>Used as a curricular component</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>Observation</td>
<td>Used as an instrument to scaffold for coaching and as a method to collect data on</td>
<td>Observations occur during experiences that align with the focus of the EPA</td>
<td>Observations provide evidence of development of competencies related to the EPA</td>
</tr>
<tr>
<td></td>
<td>supervisor's judgment of independence with the task, the context in which the EPA</td>
<td>• Multiple assessment modalities may map to a given EPA</td>
<td>• Multiple assessment modalities may map to a given EPA</td>
</tr>
<tr>
<td></td>
<td>was observed, and feedback provided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summative assessment</td>
<td>• Competence committees make decisions about the achievement of individual EPAs,</td>
<td>Clinical competency committees review assessment data and make judgments about</td>
<td>Clinical competency committees review assessment data and make judgments about</td>
</tr>
<tr>
<td></td>
<td>based on collated EPA observation data</td>
<td>progression and completion of training</td>
<td>ratings on the competency developmental scale, progression, and completion of</td>
</tr>
<tr>
<td></td>
<td>• These decisions contribute to judgments about learner’s competence, progression,</td>
<td></td>
<td>training</td>
</tr>
<tr>
<td></td>
<td>and completion of training</td>
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Types of EPAs are written and used. Aspirational EPAs describe professional activities that the professional body would endeavor for the trainee to demonstrate, but completion of training is not based on having been entrusted with these tasks. Terminal EPAs describe professional activities of the discipline that the trainee must demonstrate and be entrusted with before the completion of training; typically, these are advanced tasks of the discipline, with entrustment

Figure 1 The sequencing of RC-EPAs across stages of training. Reproduced with permission from the Royal College of Physicians and Surgeons of Canada.
Academic Medicine, Vol. 96, No. 7S / July 2021 Supplement

National Efforts to Implement EPAs

often granted only at the latter part of training. As developmental EPAs, RC-EPAs demonstrate a progression of complexity and responsibility across the duration of training. RC-EPAs acknowledge that graded responsibility includes the concept that residents in early stages of training can be entrusted with simple tasks of the profession.

All 3 forms of EPAs can be linked to the Core Components of CBME. The advantages of RC-EPAs are that the developmental approach used in their design and development builds in the sequence of progression. This facilitates their use at the bedside for teaching, learning, and assessment and incorporates entrustment decisions that enable time-variable training based on demonstration of competence.

Developing RC-EPAs

For each discipline, RC-EPAs are written by the discipline's specialty committee and applied in all programs in that discipline that are accredited by the Royal College. Thus, RC-EPAs are developed at a national level, with input provided by a broad representation of the discipline; specialty committee members include representatives from all regions of Canada, representatives from the national certification examination committee as well as the national specialty society, and the program directors of all accredited programs. Resident representatives are invited to join that work. The RC-EPAs

Box 1
Sample RC-EPA (Used at a Junior Stage of Residency Training in Pediatrics)*

<table>
<thead>
<tr>
<th>Pediatrics Foundations EPA #5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessing, diagnosing, and managing patients with common pediatric problems</strong></td>
</tr>
</tbody>
</table>

**Key features**
- This EPA includes performing a comprehensive and/or targeted history and physical examination for a patient with a new presentation or an exacerbation of a preexisting illness that is common in pediatric care.
- It also includes developing a differential diagnosis and initial management plan and presenting the case to a supervisor.
- This EPA does not include assessing and managing patients who are critically ill or have complex multisystem problems.

**Assessment plan**
Direct observation or case review by supervisor, subspecialty resident, or senior resident

**Use Form 1. Form collects information on:**
- Type of observation: direct; case review
- Event observed (select all that apply): history; physical; diagnosis; management plan
- Age: neonate; infant; preschool; school age; adolescent
- Setting: inpatient; outpatient; emergency department; community; on call/after hours
- Type of condition: respiratory; gastrointestinal; ID; cardiac; rheumatic/musculoskeletal; hematology/oncology; endocrine; neurology; renal/ genitourinary; otoaryngology/opthalmology; dermatology; genetic; mental health; developmental/behavioral/psychosocial; allergy/immunology
- Presentation: dehydration; fever; respiratory distress; other (please specify)

Collect 10 observations of achievement
- At least 5 direct observations of a component of history and/or physical
- At least 1 from each age group
- At least 5 types of condition
- At least 1 observation for each of respiratory distress, dehydration, and fever

**CanMEDS milestones**

1. ME 2.2 Elicit a history, including the perinatal history as relevant
2. COM 2.1 Conduct the interview in a patient-centered manner
3. ME 2.2 Perform the physical exam in a manner that minimizes discomfort or distress, without excluding key elements
4. ME 2.2 Perform a physical examination relevant to the presentation
5. ME 2.2 Adapt the clinical assessment to the child's age and development
6. COM 2.3 Seek and synthesize relevant information from other sources (e.g., family, medical record)
7. ME 2.2 Develop a differential diagnosis relevant to the patient's presentation
8. ME 1.3 Apply knowledge of the limitations of blood volume on laboratory testing and the challenges of medical imaging in children
9. L 2.1 Consider costs when choosing care options
10. ME 2.2 Select and/or interpret appropriate investigations
11. ME 2.2 Synthesize and interpret information from the clinical assessment
12. ME 2.4 Develop a plan for initial management

are then implemented at the local level, with input from local stakeholders and adaptation to the local training context.

RC-EPAs are written for the sequenced progression of residency training. The specialty committee applies an outcome-based approach. First, they consider what society needs from graduates in that discipline. Next, they consider the progression of competence and autonomy across the stages of the residency program. Finally, they describe the tasks and responsibilities that a resident would be expected to perform by the end of that stage.

As residents progress from novice to expert through training, they will encounter multiple RC-EPAs—the number will vary depending on the duration and focus of that stage of training. As residents transition from medical school to residency, the RC-EPAs are probably simple and small in scope. As they progress through residency, the RC-EPAs are likely to become larger and broader as the residents demonstrate the ability to assume responsibility for increasingly complex tasks of the profession. The sequencing of RC-EPAs across stages of training is illustrated in Figure 1.

As of July 2020, RC-EPAs have been written for 19 specialties and 13 subspecialties. The number of EPAs per discipline ranges from 15 to 87, with a mean of 29 for medical disciplines (range 15–46) and 44 for surgical disciplines (range 27–61).

Incorporating RC-EPAs in Residency Education
The Royal College determines the sequence of progression of competence within the design of the RC- EPA. The description of the task (within the key features) sets out the expectations for entrustment. This approach increases the number of overall RC-EPAs per discipline, because of the need to create RC-EPAs for each developmental stage of a resident’s progression, but greatly simplifies the description of the RC-EPA for supervisors and residents (Box 1).

RC-EPAs align with the clinical activities of the resident as they progress through residency training. Supervision of clinical work is linked to the RC-EPAs related to that activity, focusing resident and supervisor attention on authentic clinical tasks and prompting instruction relevant to resident development. The need for the supervisor to adapt the CanMEDS competency framework to the clinical environment is obviated as the competencies relevant to the RC-EPA have been linked to the relevant CanMEDS roles, via the milestones, by the specialty committee.

The assessment plan’s entrustment score, context menus, and milestones facilitate quick and standardized documentation of the supervisor’s observation of the resident’s performance. This information provides a rich and descriptive narrative for the competence committee as they make recommendations and decisions about a resident’s progress.

Summary
RC-EPAs are a unique configuration of EPAs designed to facilitate CBTV models of medical education. RC-EPAs support time-variable progression based on competence and achievement of entrustment by being arranged developmentally across residency training. They can be applied across a wide breadth of presentations, conditions, and settings relevant to the discipline, and the important variables that describe the context in which the task was performed can be easily collected and recorded at the time of RC-EPA observation and documentation. RC-EPAs link the CanMEDS competency framework to daily professional activities of the discipline through the integration of milestones, providing an assessment framework based on supervision and entrustment as the foundation of time-variable CBME. Others in health professions education looking to use EPAs for CBME can use this approach to enable novel CBTV designs.

Funding/Support: None reported.
Other disclosures: J. Karpinski and J.R. Frank are both employees of the Royal College of Physicians and Surgeons of Canada, the sponsor of the Competence by Design model of medical education.

Ethical approval: Reported as not applicable.

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