Post MD Education
UNIVERSITY OF TORONTO

Best Practices in Evaluation and Assessment (BPEA)

Lessons Learned from Innovators and Innovations in Competency-Based Medical Education (CBME): Consultations with Residents and Faculty Leaders Across Three Programs at the University of Toronto

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1. Executive Summary

1.1. Background

Postgraduate medical education in Canada and abroad is shifting gradually toward a competency-based educational model and while implementation is ongoing, challenges exist. The goal of competency-based medical education (CBME) is to graduate competent physicians and surgeons, align the medical curriculum with societal needs and expectations, and optimize patient outcomes. In order to achieve these goals, the facilitators and challenges of CBME planning and implementation must be identified and either fostered / encouraged or overcome, respectively. As CBME emphasizes the *demonstration* of competence in skills and abilities deemed essential for future practice, more frequent direct observation of residents in clinical practice is needed. When implemented and applied successfully, feedback given by faculty is more timely, frequent, and constructive, promoting growth and progression of the resident and, ultimately, the achievement of curricular goals.

Three programs at the University of Toronto are currently in, or have implemented elements of, a competency-based curriculum: Family Medicine (FM), Palliative Medicine (PM), and Orthopaedic Surgery (OS). This provides an opportunity to reflect and examine facilitators and challenges as they relate to CBME implementation, and to inform the work of the Best Practices in Evaluation and Assessment (BPEA) Working Group for Competency-Based Medical Education (CBME). This report sought to understand the relatively early experiences of faculty and residents already engaged in CBME, with the aim of identifying and sharing "lessons learned" with programs preparing to embark on CBME planning and implementation.

1.2. Methodology

Residents and faculty leaders who were part of the first, or early, cohorts from FM, PM, and OS were asked to participate in one of four semi-structured focus groups. Our interview guides probed residents and faculty for their top lessons learned with regards to assessment, feedback, and learning in a competency-based curriculum; challenges they faced; changes to expectations and responsibilities with respect to assessment; changes to frequency and type of assessments; the presence/absence of "assessment fatigue" in residents and faculty; and what preparation or information they now wish they could have had before starting in the competency-based system. The focus group transcripts and summary notes drafted by focus group facilitators and observers were analyzed iteratively, using a content analysis approach.

1.3. Results and Discussion

From our consultations with residents and faculty, we identified the following key findings concerning residents' and faculty's experiences of CBME; faculty development strategies for CBME implementation; and strategies for improving faculty engagement.

Key Findings Related to **Residents' Experiences of CBME:**

1. Residents' experiences in the CBME curriculum (FM and OS) and Entrustable Professional Activity (EPA) pilot (PM) were deemed **positive overall**.
2. Residents appreciated the increased direct observation and assessment they received from faculty supervisors.
3. Residents were given more frequent, richer, and more valuable feedback that helped to inform their learning.
4. Residents cautioned against having too many assessments in a given time period that used the same means of evaluation (e.g. direct observation).

Key Findings Related to **Faculty's Experiences of CBME:**

1) Faculty appreciated the value of direct observation and increased assessment.
2) Faculty have not all "bought in," that is, there still remains a proportion of faculty that remain non-engaged or minimally engaged.
3) Faculty must undergo a cultural shift, which can only occur slowly and gradually, to adjust to the CBME changes (e.g. assessments, feedback). For example, the cultural shift required will be greatest in programs unaccustomed to utilizing direct observation and documenting feedback.

Faculty *Development* Strategies for CBME Implementation:

1) took considerable, repeated efforts
2) included ongoing workshops
3) included one-on-one meetings with resistant faculty
4) involved engaging faculty through "champions" or dynamic leaders in CBME and assessment

Faculty *Engagement* Strategies for CBME implementation:

1) minimized and simplified the expectations of them
2) created easy-to-use online assessment platforms
3) simplified tool design and purpose
4) reduced the types of assessments required

In addition, we identified key "lessons learned" around CBME implementation as it relates to: the implementation process and feasibility, change management, the assessment program, and features of assessment tools.

2. Introduction

2.1. What is Competency-Based Medical Education (CBME)?

Competency-Based Medical Education (CBME) is an outcomes-based educational model, emphasizing the demonstration of competence in key skills and abilities deemed essential for future practice, and de-emphasizing time. Residents are assessed more often, with a preference for direct observation. Feedback is more timely, frequent, and constructive, and therefore more helpful in the growth and progression of the resident. The ultimate goal of competency-based education is to graduate competent physicians and surgeons, align the medical curriculum with societal needs and expectations, and optimize patient outcomes.

2.2. Descriptions of CBME Curricula and/or Innovations Employed by Residency Programs at the University of Toronto

Three residency programs at the University of Toronto are currently in, or have previously implemented elements of, a competency-based curriculum. Family Medicine and Orthopaedic Surgery established their own competency-based curricula over five years ago. Palliative Medicine has piloted Entrustable Professional Activities (EPAs) with their residents and faculty. Below are descriptions of the CBME initiatives of each of these three programs.

2.2.1. Family Medicine Triple C CBC Overview

In 2010, the College of Family Physicians of Canada (CFPC) Working Group on Postgraduate Curriculum Review (WGCR) drafted a report proposing that competency-based medical education be integrated into Family Medicine (FM) residency education.[1] The working group proposed that all FM residency programs in Canada develop and implement a competency-based curriculum in line with the following principles[1]:

1) Comprehensive – i.e. that the curriculum includes instruction on, and assessment of, a full range of competencies, as per the CanMEDS-FM competency framework (not just the Medical Expert Role).

2) Focus is on continuity of both patient care and resident education.

3) Centered in Family Medicine – i.e. Family Medicine is to control curriculum planning, the goals of education, and educational elements for their program; the clinical and educational contexts are to be aligned to / situated in Family Medicine; and the clinical and educational content must be relevant to Family Medicine trainees.

In 2011, this curriculum – known as the "Triple C" CBME program – was implemented at the University of Toronto.

The assessment program for the Family Medicine's Triple C program at the University of Toronto includes the following assessments:

- Field Note – a formative, short, open-ended assessment that is tagged to different CanMEDS-FM competencies and clinical/educational settings. This type of assessment is used to evaluate a resident's performance from direct observation during a specific procedure, event, clinical encounter, or even a whole clinical day
- In-Training Evaluation Report (ITER) – summative assessment of residents' performance at the end of a clinical unit / rotation (informed by the Field Notes completed during this unit / rotation)
- 6-month review – review of resident's progress, informed mainly by both completed ITERs and Field Notes during this time period
- Written Test – a knowledge-based test completed by all residents three times a year

2.2.2. Palliative Medicine EPA Pilot Overview

In order to improve resident assessment in Palliative Medicine (PM), EPAs were developed in collaboration with PM educators and content experts in a consensus model and then further refined, first through focus groups and then through a nationally-distributed survey of PM physicians.[2] A total of 12 EPAs were developed in this way for PM residency programs in Canada.

In 2014, three of the 12 EPAs were piloted with PGY1 residents. In preparation for the pilot, brief orientation videos (three-minute You Tube videos)[3-7] and two-page descriptions of each EPA were drafted. Faculty and residents received guidance around giving (faculty) and receiving (residents) results of assessments and feedback following direct observation. Online assessment tools were developed.

The EPAs were piloted with engaged faculty who were accustomed to supervising residents.

2.2.3. Orthopaedic Surgery CBC Overview

The strains on surgical education resulting from reduced resident working hours, patient safety concerns, and identified clinical and knowledge deficits in residents, propelled the Orthopaedic Surgery (OS) residency program at the University of Toronto to undergo curriculum reform.[8] Using the Royal College of Physicians and Surgeons (Royal College) CanMEDS competency framework, OS transitioned into a competency-based curriculum (CBC).[8]

Orthopaedic Surgery's CBC was first implemented with PGY1 residents in July 2009, but was later expanded to other resident cohorts when the advantages of this curriculum became evident.[8] The goals of the new competency-based curriculum were to:[8]

1) Increase the pace at which technical skills were acquired (largely through the development and implementation of Surgical Boot Camp early on in the program – an

intensive, simulation-based training program where technical skills are practiced until proficiency is reached)

2) Reduce inefficiencies (i.e. non-essential and/or low-impact educational activities) in education

3) Increase formative and summative assessment

4) Focus on the acquisition of competencies rather than on *time* spent in clinical activities.

The curriculum was divided into 21 discrete modules, each with its own faculty lead, objectives, educational content, resources, and assessments.[8]

2.3. Purpose of this Report

To inform the work of the Best Practices in Evaluation and Assessment (BPEA) Working Group for Competency-Based Medical Education (CBME), we sought the input of three University of Toronto programs that have had multiple years of experience implementing (CBME) into their residency programs: Family Medicine (FM), Palliative Medicine (PM) and Orthopaedic Surgery (OS). CBME implementation encompassed (all or in part): comprehensive curriculum mapping, the development of assessment plans and workplace-based assessments, faculty development, and program evaluation.

Residents and faculty leaders who were part of the first, or early, cohorts from each of the three programs were asked to participate in one of four focus groups. We sought to understand the experiences of faculty and residents in CBME, with the aim of sharing their "lessons learned" with later cohorts embarking on CBME implementation.

3. Methods

We conducted focus groups using a semi-structured interview approach with pre-circulated questions. Faculty leaders and residents were recruited to participate from three University of Toronto residency programs (Family Medicine, Palliative Medicine, and Orthopaedic Surgery) that had experience implementing CBME. More detailed information about the focus groups can be found in Table 1.

Our interview guides probed residents and faculty for their top lessons learned with regards to assessment, feedback, and learning in a competency-based curriculum; challenges they faced; changes to expectations and responsibilities with respect to assessment; changes to frequency and type of assessments; the presence/absence of "assessment fatigue" in residents and faculty; and what preparation or information they wished they could have had before starting in the competency-based system. The focus group questions used for residents and faculty can be found in the Appendix (section 7.3).

The focus group interviews were recorded and transcribed for analysis. Summaries of each interview were prepared using both the transcripts and the interviewers' notes. The summaries

were verified by participants and then refined, based on their comments. One of the four focus group recordings (that of Orthopaedic Surgery faculty leaders) was faulty, and thus did not get transcribed. The summary and interviewer's notes for this focus group were thus the sources of data for our analysis.

Using a content analysis approach, the focus group transcripts and summaries were iteratively coded. Table 2 details the coding framework used in analysis.

"Best practices" for CBME were also identified from the transcripts and summaries and are collated in section 5.

4. Results and Discussion

4.1. Focus Group Details

Table 1 provides details of the dates, delivery method, participant type, and number for each focus group conducted.

Table 1 Focus Group Details by Program

Program	Description of CBME Model / Innovation Implemented	Focus Group #	Date	Delivery	Participant N	Participant Group(s) Interviewed	
						Residents	Faculty Leaders
Family Medicine (FM)	Model: "Triple C" competency-based curriculum Date Implemented: 2011	1	June 3, 2016	In-person	4	-	✓
Palliative Medicine (PM)	Innovation: Pilot of 3 EPAs 2014-15	2	May 30, 2016	Phone	3	✓	-
Orthopaedic Surgery (OS)	Model: Competency-Based Curriculum (CBC) Date Implemented: July 2009	3	June 1, 2016	Phone	3	✓	-
		4	May 26, 2016	Phone	3	-	✓

4.2. Coding Framework

Table 2 lists and described the codes used in the analysis of all four focus group transcripts and summaries. More detailed summaries of each focus group can be found in Appendix 7.2.

Table 2 Coding Framework Developed for the Analysis of Focus Group Transcripts

	Code		Description	Examples	Focus Group Coding (Presence / Absence)		
					Family Medicine	Palliative Medicine	Orthopaedic Surgery (resident / faculty)
1	Assessment Tools, Program Features, and Outcomes	1.1 Tool Descriptions	Includes descriptions of specific tools used, their criteria and use	E.g. Field Notes (FM), EPAs (PM), ITERs	✓	✓	✓
		1.2 Assessment Program Features	Includes comments on and critiques of assessment program features employed (such as frequency, timing, format – e.g. online vs. paper, means of acquiring, e.g. direct vs. indirect observation)	E.g. "EPAs…need to follow the natural work flow as much as possible" (PM) E.g. The frequency of assessments was appropriate (OS)	✓	✓	✓
		1.3 Assessment Outcomes	Includes comments on the utility, quality, and accuracy of evaluations, and the feedback residents received as a result	E.g. ITERs deemed to be of greater accuracy and value when performance was evaluated based on direct observations of the resident (PM) E.g. Direct observation and competency-based assessment resulted in more rich, frequent and useful / valuable feedback (FM, PM, OS)	✓	✓	✓
2	Change Management		Includes statements about faculty and /or residents' openness / willingness to change and/or any strategies mentioned to facilitate change	E.g. The importance of implementing curricular changes (such as increasing the frequency of assessments completed) very gradually E.g. The suggestion to be patient and persistent, as change is a slow process	✓	-	✓
3	Cultural / Attitudinal Changes		Includes comments about cultural and/or attitudinal changes that have occurred or need to occur for CBME	E.g. CBME requires a culture shift in faculty whereby they are completing assessments and giving feedback more regularly (FM, PM, OS)	✓	✓	✓

	Code	Description	Examples	Focus Group Coding (Presence / Absence)		
				Family Medicine	Palliative Medicine	Orthopaedic Surgery (resident / faculty)
4	Expectations of Residents	Refers to the frequency and improved clarity of expectations for residents resulting from CBME	E.g. EPA and its assessment provides specific guidelines and criteria for residents to follow (PM) E.g. In the traditional model, residents were given a book at the beginning of their rotation and served as an apprentice in clinic; in the CBC model, residents have a curriculum map and a clear set of objectives for what they need to read and study and what they will be evaluated on (OS)	-	✓	✓
5	Faculty Engagement and Faculty Development	Includes comments on faculty's willingness to adopt CBME practices and adhere to its standards; and their level of engagement with respect to getting assessments completed Also includes faculty development efforts and/or program strategies to improve faculty engagement in any/all elements of the curriculum	E.g. Faculty in OS adapted to CBC at different paces. Demonstrating the value/purpose of new CBC to faculty and using local "champions" to engage faculty were some strategies used to improve faculty "buy-in" (OS) E.g. In FM, monthly reports are generated for faculty, disclosing their number of completed assessments. This encourages faculty below target to increase their number of assessments.	✓	✓	✓
6	Resident Engagement	Includes comments on the level of resident engagement in the CBME program / initiative	E.g. "And, in fact, now residents are so aware of it that they're asking, "can you fill out a Field Note for me?"" (FM)	✓	✓	✓

	Code	Description	Examples	Focus Group Coding (Presence / Absence)		
				Family Medicine	Palliative Medicine	Orthopaedic Surgery (resident / faculty)
7	Curriculum / Curricular Element Design and Implementation	Includes comments on and/or criticisms of the CBME curriculum or curricular element design and/or the process of implementation	E.g. By virtue of being part of a "pilot," the implemented PM EPAs were perceived by some residents as "extra work" and not of priority. Residents were also told that the EPAs "didn't count" and this changed their perception of the tool ("sometimes, it felt artificial") (PM)	✓	✓	✓
8	Residents in Difficulty	Includes comments on residents in difficulty as it pertains to the CBME curriculum or curricular element	E.g. CBC has allowed more early identification of residents in difficulty. As a result fewer residents undergo formal remediation. Residents are first placed into an enriched educational program and given more time (OS)	✓	-	✓

5. [a]Abbreviations: EPA = Entrustable Professional Activity, CBME = Competency-Based Medical Education, CBC = Competency-Based Curriculum, FM = Family Medicine, PM = Palliative Medicine, OS = Orthopaedic Surgery, FG = Focus Group

4.3. Summary of Main Themes

4.3.1. Assessment Tools, Program Features, and Outcomes

Variation between programs in familiarity with direct observation

The practice of conducting direct observations was not as uncommon in Family Medicine and Palliative Medicine as it was in Orthopaedic Surgery. Family Medicine has had a long history of conducting direct observations of their residents. FM residents have been accustomed to having their performance observed, as cameras are often positioned in clinical settings for assessment and/or educational purposes. Thus, this element of the competency-based Triple C program was not a significant change from the traditional model, for faculty or residents**. The major difference between the two models, the old and the new, was the requirement for more *documentation* of residents' performance. (FM)**

Palliative Medicine residents, having come from the Family Medicine program, also felt fairly comfortable being directly observed. (PM) Hence, assessments through direct observation may be more challenging for programs that do not have a history of this practice. **In these programs, a greater cultural shift is required of faculty, in particular.**

Increased accuracy of assessments and more frequent, richer feedback associated with tool use and frequency

FM Field Notes allow more comprehensive assessment of residents. They can be reviewed by site coordinators in order to see which competencies are the least and most reported on, and to identify which residents are not getting enough assessments. Field Notes completed for a given clinical unit / rotation can also be collated and distributed to individual preceptors to inform their summative ITER evaluations. This can improve the accuracy and value of the ITER. One potential issue, however, is positive bias in selecting encounters for assessment (e.g. faculty may prefer to assess residents on encounters where residents performed best). (FM)

PM EPAs and OS competency-based assessments were developed to stimulate direct observation of residents' performance on key skills pertinent to their future practice. EPAs were regarded by residents as "a better way to conceptualize learning." PM residents were more confident in their ITER evaluations in rotations where EPAs were piloted than where they were not, because of having more direct observation in the former. The OS competency-based assessments were said to build residents' confidence and to stimulate learning. OS residents in CBC build their surgical skills early and are given opportunities to do more surgeries when they demonstrate that they are ready and capable.

Residents from all three programs reported receiving more frequent, immediate, what they described as rich, and accurate feedback, and on a greater range of CanMEDS competencies, as a result of their competency-based curricula and assessment frameworks. This was noted to increase residents' confidence and awareness of their skill level at different stages of training. This feedback has been found to be **especially useful at the beginning of residency training**.

Words of caution

Residents cautioned against having too many assessments in a given time period that use the same means of evaluation (e.g. direct observation). (PM) Doing so could result in the inaccurate completion of assessment forms and/or lack of engagement on the part of both residents and faculty. For example, initially, there were multiple assessments in PM requiring direct observation of consults (including the EPA tool). This led one faculty member to assess a resident on a hypothetical scenario, rather than an observed clinical encounter for one of their EPA assessments (reducing the accuracy of entrustment for this activity, as a result). (PM)

In PM, it was noted that motivated faculty were pre-selected for participation in the pilot, and that this could have influenced the effective uptake of, and value derived from, these tools. Residents were, therefore, uncertain to what extent improvements to feedback depended on the supervisor versus the assessment tool.

4.3.2. Cultural / Attitudinal Changes

Both faculty and residents have had to adapt to changes in practice imposed by competency-based curricula. The greatest adjustment for faculty has been to completing more frequent

assessments with direct observation, while residents have had to adjust to being assessed more critically, and receiving lower scores than they may be accustomed to.

Currently, for example, there is an expectation for FM faculty to produce near-daily documentation on resident performance. This has required a culture shift – to get used to giving more frequent brief formative feedback to residents, rather than relying on summative feedback given at the end of a clinical rotation. This cultural change has been gradual, through slowly increasing the target number of assessments. (FM)

With the competency-based curricula, it is expected that residents will receive lower scores than they might have been accustomed to in undergraduate medicine, especially at the beginning of their training. It takes about six months for FM residents to get used to this change in evaluation standards, and with each new cohort, the expectations have to be set. (FM) Residents were able to adapt to the different evaluation metric. Likewise, in OS, it was understood that, as PGY1 residents, the expectations of them were lower. OS residents adjusted to this concept and became more accepting of lower grades and more receptive to critical feedback. (OS)

4.3.3. Expectations of Residents

In competency-based medical curricula, residents are given greater clarity concerning learning and assessment objectives. For example, residents in OS are given a detailed curriculum map with specific objectives for what they need to read and study and what they will be evaluated on. By virtue of receiving more constructive feedback, residents also reportedly have a better understanding of their progress in training and whether they are on or off trajectory.

As resident performance is measured against certain benchmarks of proficiency in OS, you end up with a more consistent “end product” of performance across residents in the same module.

Lastly, residents are expected to take greater responsibility for their own education, including initiating assessments in their later years; incorporating faculty feedback and evaluations to improve performance and thus demonstrate competence; and helping with logistics, such as scheduling meetings with supervisory staff to go over module objectives and assessments. (OS)

4.3.4. Faculty Engagement and Faculty Development

While assessment frequency has increased considerably, there are still faculty who are not meeting their projected targets. Even seven years after implementation of the OS CBC, approximately 10% of faculty are still resistant to the changes. In order to prompt faculty to assess more, site coordinators in FM, for example, distribute monthly reports to faculty disclosing the quantity of Field Note assessments completed by each. Differences in technological aptitudes between faculty have necessitated ongoing faculty development in the use of online tools and platforms. Site coordinators also encourage faculty to keep the application open on their computer or smartphone for timely and quick use during a clinical encounter. In addition, both OS and FM leaders have met one-on-one with faculty to demonstrate the value of the program and assessments, communicate the changes to the program, discuss the assessment process, and provide instruction on logging in and using the assessment program, as well as on interpreting resident reports. These efforts have led to an

increase in uptake and assessment submissions in FM. Lastly, both OS and FM emphasized the importance of having faculty "champions" who are passionate and engaging leaders in the domains of competency-based education and assessment. These "champions" can help to generate enthusiasm among faculty, encouraging them to participate in curricular elements. (FM)

Faculty are more willing to adopt new assessment tools and methods that do not duplicate efforts, add value, and are easy and quick to complete (including both the tool itself and the online assessment platform). To keep faculty engaged, it is important to minimize expectations of them at the beginning and to build these up gradually as faculty make headway and get used to the changes that have been made.

4.3.5. Resident Engagement

To avoid falling behind, the initial resident cohorts of the Orthopaedic Surgery competency-based curriculum (CBC) had to work hard and study often, right from the start of the program and each module. Residents, while finding it difficult at the start of their training, adapted to the work-load, and to the ongoing need to learn and apply new content and consolidate understanding in day-to-day clinical practice, and generally to the many expectations of them.

In the early stages of CBME implementation, residents were encouraged to give ample feedback on how the program could improve, and this was appreciated by residents. (OS) They also appreciated the opportunity to contribute to the curriculum design and roll-out, and seeing prompt changes as a result of their feedback.

Initially, faculty were more responsible for initiating and completing assessments, especially the faculty module leaders. However, over the years, the responsibility fell more to the residents. (OS)

While assessment fatigue was not as much of an issue with residents as it was with faculty, the logistics of organizing their clinical experiences with different supervisors and sites, as well as within and between modules, *was* fatiguing for the residents. (OS)

4.3.6. Curriculum / Curricular Element Design and Implementation

Residents found the educational modules variable in terms of type and quantity of content posted onto module websites, and the same was true of the assessments and resources available for them. Faculty leaders who were more engaged and invested in the CBC were said to include more content and assessments in their modules. These modules were deemed to be more beneficial learning experiences for residents. (OS)

While OS residents could advance ahead in their program with the CBC model, some reported that the combined length of time required to obtain evaluations and feedback and the scheduling of these activities prevented them from moving forward as quickly. The number of assessments per module was found to be appropriate, in that they were not overly onerous to complete and were of sufficient number to provide a comprehensive and accurate overview of their performance.

4.3.7. Residents in Difficulty

Faculty leaders have found that the CBC in OS enables earlier identification of residents in difficulty. This means that residents' performance and knowledge gaps can be treated before they become too ingrained, increasing their chances of improvement. The approach is that residents in difficulty are first placed into an enriched educational curriculum that allows them more time to develop the necessary skills and/or knowledge.(OS) Occasionally, when the gaps are too big or too numerous, or improvement is not forthcoming, formal remediation is needed. In some rare situations, identification of "poor fit" necessitated the advice to transfer to another specialty with a better fit for the individuals' strengths.

4.4. Limitations

A potential limitation of this study is participant recollection bias. The interview questions were focused on faculty and residents' experiences during the early phases of implementation. However, these interviews were conducted 2-5 years after the educational changes. Participants' perspectives and memories of specific events might therefore be influenced by shaded by intervening events and experiences"?

5. Identified Best Practices for CBD Implementation And Assessment

The following best practices were identified from our consultations with residents and faculty in FM, PM, and OS, as they relate to: the implementation process and feasibility, change management, the assessment program, and features of assessment tools.

5.1. Implementation Process and Feasibility

1. Faculty and residents can adapt to curriculum changes more easily when they are implemented gradually and incrementally. (FM)

2. Faculty leaders situated "on the ground" can be helpful in collecting information around some of the early challenges and/or stress points of the model design or implementation, and can provide context for these issues. (PM)

3. It is important to minimize logistical challenges / barriers (e.g. scheduling residents' assessments and educational or progress meetings with supervisors) for both faculty and residents. These can take up so much energy and resources that they ultimately threaten the implementation process and the program's feasibility. (OS)

4. Programs, while required to meet minimum standards for CBD, are encouraged to be innovative in their educational design and activities. For example, programs should be encouraged to support local initiatives. Different sites have different practice settings, educational facilities, and resources. Thus, any "extra" educational activities that different sites want to pursue should be embraced and supported. (FM)

5. Central and local support is important for faculty (of varying technological aptitudes) to complete online assessments. (FM)

5.2. Change Management

1) It is important to field test educational innovations, such as new assessment tools, with all different types of faculty – not just those who are already engaged and high-performing educators. This will provide a more realistic indication of whether or not the innovation will be successful when implemented fully and what the potential benefits and challenges might be. (PM)

2) Faculty and residents can more easily adapt to curriculum changes when implemented gradually and incrementally. (FM)

3) Curricular change to CBME is best seen as an "evolution, not a revolution." This process requires patience, time, and sustained effort. (FM)

4) "Dynamic leadership brings people together." It is important to have faculty "champions" to direct curricular change and stimulate and motivate faculty to adopt CBME principles and practices *on the ground*. (FM)

5) Include the multiple stakeholders (e.g. faculty, residents, site coordinators) who are involved in and affected by the curricular change early in the planning, design, and implementation phases, as well as in program evaluation. (FM)

6) Orient residents early and often to the new assessment standards and expectations (i.e. that residents are likely receive lower scores than they are accustomed to in the new competency-based system, especially at the beginning of their training). This will prepare them for more critical assessments and feedback that they will hopefully use constructively to progress in their skill. (FM)

5.3. Assessment Program

1) Practical targets for a total number of assessments within a given time period need to be developed in order to prevent assessment fatigue and avoid disrupting clinical work flow. (PM, OS)

2) Limit the number of different *types* of assessment forms used in a program.

3) More targeted / structured assessments are to be used for residents in difficulty. (FM)

5.4. Features of Assessment Program

1) Assessment tools should be designed to be simple to use and quick to complete in order to support the greater frequency of responses. (FM)

2) Assessment tools must be developed with the specific clinical settings and contexts of their use in mind. (PM)

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7. Appendices

7.1. Appendix 1. Interview Questions for Residents

1) Within the EPA competency-based processes, what are the TOP Lessons for Residents, in terms of:

    i) Assessment?

    ii) Feedback?

    iii) Learning?

2) What differences, if any, were there in terms of your evaluation/assessment:

    i) Frequency?

    ii) Type of assessment/evaluation?

3) Knowing what you do now, what preparation, or information, do you wish you had had before starting in an EPA competency-based system?

4) Have your expectations of faculty assessment and/or evaluation changed?

    a) If so, how?

5) In your view, have faculty's expectations of residents in EPA competency-based assessments different from those in the traditional model?

6) Was there any “assessment fatigue” expressed by Faculty? by Residents?

    a) If yes, what was the type/volume of assessments/feedback that was associated with “assessment fatigue” by Faculty? by Residents?

7.2. Appendix 2. Interview Questions for Faculty

1. Within the competency-based system, what are the TOP Lessons for Faculty about had to do differently in terms of:

   1.1. Assessment?

   1.2. Feedback?

   1.3. Learning?

2. What challenges, if any, have FACULTY faced in terms of assessment and evaluation in a competency-based program?

3. What challenges, if any, have RESIDENTS faced in terms of assessment and evaluation in a competency-based program?

4. Knowing what you do now, what preparation, or information, do you wish you had had before starting in a competency-based system?

5. How are the faculty's expectations of residents in competency-based evaluation/assessment different from those in the traditional model?

6. What responsibilities do faculty/ the program have to residents with regards to evaluation/assessment in a competency-based environment?

7. Was there any “assessment fatigue” expressed by Faculty? by Residents?

8. If yes, what was the type/volume of assessments/feedback that was associated with “assessment fatigue” by Faculty? by Residents?

7.3. Appendix 3. Shared Key Messages Among the Four Focus Groups

1) **CBME resulted in improved feedback (more useful, structured, rich, and accurate). Both residents and faculty expressed the value of this feedback and deemed it an important outcome of CBME.**

- EPAs provide a nice framework for providing feedback
- Richer feedback
- Feedback was based on more direct observation
- "I think I benefited a lot from being assessed, getting the feedback on how things are going, and getting confidence from that, that you are in fact doing well, and not just showing up for the work that you needed to do and just going through things without really learning as much as you should."
- Feedback builds up confidence early on
- All residents, but especially junior residents, get *more* feedback on intrinsic CanMEDS competences
- More frequent assessments gave faculty concrete, meaningful information to base their feedback on, and also to objectively base their end of block decisions on
- Feedback became more useful to residents because it was frequent, timely, and accurate
- Residents have come to expect and ask for assessments
- There is improved documentation of feedback and of performance

2) **CBME has been more resident-centred.**

- More "in control" of residency education
- More responsibility for learning, assessments, monitoring needs, seeking feedback, and building skills based on feedback

3) **CBME expects more of residents.**

- Residents need to "hit the ground running"
- Residents had more responsibility in the early stages of their training
- "Necessary" to staying up-to-date on content reading, prep for tests. Keeping up to date wasn't optional.

4) **Faculty involvement and development were key to CBME implementation.**

- Need faculty buy-in for success
- Need to minimize impact on faculty by minimizing expectations of them
- Faculty adapted to CBME at different paces. After several years, about 10% of faculty were still resistant to CBME
- Need clear communications for CBME faculty development (e.g. for considerable one-to-one meetings and workshops)
- Sharing interim summary reports with staff helps them see gaps and encourages staff to increase their assessments, especially in areas where more information is needed to get a better picture of what the resident can do
- It is important to have professional development leads, as professional development is a huge challenge
- Faculty needed coaching on how to deliver critical and constructive assessments, not just positive feedback
- Advise a program to limit the number and types of forms faculty need to fill out, so there's less confusion about what needs to be filled out and when

5) **Features of effective workplace-based assessments include:**

- Following the natural work flow of clinical practice
- Providing residents with valuable, robust feedback
- Equipping faculty with a framework for providing feedback
- Learning the system is easy
- Completing the forms is time-efficient

6) **Both residents and faculty leaders view CBME as a positive improvement for residency education.**

- A better way to conceptualize learning
- Teachers saw the value of the EPAs
- Residents have a detailed curriculum map with a clear set of objectives for what they need to read and study, and what they will be evaluated on
- Residents are given more direction, especially at the beginning of a block/rotation

- Clarity of program expectations (as per defined map, assessments, and outcomes) allows residents to be very focused and achieve the objectives quite well. The expectations are quite consistent across each resident (i.e. there is a more consistent “end product” of performance across residents in same module)
- The new curriculum is more responsive and highlights residents in difficulty and residents with professionalism issues earlier
- A highlight is early identification of residents who need more help, but who do not necessarily need formal remediation. First efforts are at enriched education involving more time
- In each module, especially in the early stages, residents are able to master specific focused activities (e.g. patient care management) and procedures (e.g. specific types of surgical procedures from start to end – first basic, then more complicated procedures or more complex patients)
- Patient care by residents in early modules is better, likely with higher patient satisfaction and better judgement from residents as to what they can or cannot do
- Senior residents have reported being, and also appear to be, more confident when writing their Royal College of Physicians and Surgeons of Canada (RC) exams, because they’ve had practice writing intense multiple choice exams before their final

7) **Both residents and faculty leaders viewed implementing CBME as “more work.”**
   - Assessments take time for residents to secure/schedule
   - Early on, taking responsibility, including the logistics, was very fatiguing to the residents
   - Residents still need to ask for assessments (i.e. multiple years following implementation of CBME)

8) **CBME resulted in attitudinal and cultural changes.**
   - Residents needed to manage their own expectations for high/positive assessments, as they were not (yet) good at many of the skills and procedures they were doing
   - Now, residents like and want feedback. This was noted by both residents and faculty leaders
   - Expect culture change to occur slowly
   - There had to be a culture change from giving summative feedback at the end of each block to giving small amounts of feedback frequently (i.e. daily, multiple times a week)

9) **Implementation of CBME needs incremental, interactive implementation.**

- Need to determine the correct number of EPAs and frequency of assessment
- Expectations of residents were viewed as pretty balanced
- Started with paper forms and were quickly overwhelmed. Now using online forms, but need more integrated system for all forms (i.e. currently have different forms in different online systems)
- Important to set targets or expectations at the beginning of competency-based implementation about the frequency of evaluations
- Gradual implementation is key: be patient
- Need to clarify expectations of residents at the start of every year because of resident turnover
- Need to (re)set resident expectations at the start of every year by conveying the message that it's OK (and expected) that they will receive feedback that their performance is less-than-perfect feedback.
- Involve the multiple stakeholders, including residents, in committees to develop the forms, ITERs, and Field Notes

7.4. Appendix 4. – Family Medicine – Faculty Leader Focus Group

Note: The summaries were drafted by facilitators and/or observers of the four focus groups and were validated by most/all participants

Family Medicine has been using a competency-based curriculum (called "Triple C") since 2011.

Triple C encompasses:

1. Competency-based,
2. Centred in family medicine.
3. Reflects continuity of care

They use a CanMEDS-FM framework and Evaluation Objective framework to look at assessments.

Faculty:

- Biggest change was documentation of assessments. In Family Medicine, they have been doing direct supervision for a long time, but there was infrequent documentation of the supervision.
- There had to be a culture change from giving summative feedback at end of block to giving small amounts of feedback frequently (i.e. daily, multiple times a week).
- More frequent assessments gave faculty concrete, meaningful information to base their feedback on and also to objectively base their end of block decisions on.
- Goal needed to be making Field Notes easy to use, not onerous.
- Field Notes (i.e. assessment tool) are very flexible. Field Notes don't need to be filled out in their entirety. Faculty can choose which part of the patient encounter they want to give feedback on. It may be a single competency or more than one.
- Sites and program can run interim summary report to inventory the frequency of the different roles, different diagnoses, different patient types, etc., and number of assessments per staff.
- Sharing interim summary reports with staff helps them see gaps and encourages staff to increase assessments, especially in areas where more information is needed to get a clear picture of what resident can do.
- Forms are web-based and can be completed on mobile devices. This helps, given distributed nature of family medicine program (i.e. 15 sites, 200+ family doctor offices).
- Important to set targets or expectations at beginning of competency-based implementation about the frequency of evaluations.

- Faculty needed coaching on how to deliver critical and constructive assessments, not just positive feedback.
- Advice to limit the number of types of forms faculty need to fill out so there's no confusion about what needs to be filled out when.
- Gradual implementation is key. Be patient.
- Professional development is a huge challenge. Have professional development leads.

Faculty Perspective on Residents:

- Feedback became more useful to residents because it was frequent, timely and accurate.
- Residents have come to expect and ask for Field Notes.
- Need to clarify the expectation that residents will be "active residents" at the start of every year because of resident turnover.
- Need to (re)set resident expectations at the start of every year so they know that it's OK (and expected) that they will receive feedback that their performance is less than perfect.
- Involve the multiple stakeholders, including residents, in committees to develop the forms, develop the ITERs, and develop the Field Notes.

7.5. Appendix 5. – Orthopaedic Surgery – Faculty Leader Focus Group

The CBME pilot program at U of T has been in existence since July 2009.

The top lessons re: faculty engagement and participation in competency-based curriculum:

- Need for faculty buy-in for success of implementation. Had “champions” at each site in addition to program director.
- Expect culture change to occur slowly.
- Faculty adapted to the new program at different paces. There will always be late adopters.
- After 7+ years, approximately 10% still are resistant to the curriculum change.
- Increase faculty buy-in through leaders having personal (and repeated) one-on-one meetings with resistant/non-compliant faculty.
- Minimize impact on faculty by minimizing expectations of them.
- Advance notice and clear communication of changes, demonstration of value of process/new program, and the use of local champions were additional strategies used to gain faculty buy-in.
- CBME leaders used workshops and one-on-one meetings to teach faculty about the required skills for each module (i.e. EPAs).
- Faculty need regular clarification on the various specific assessment forms for the different modules and their differences from the overall assessment and record in the main online system (i.e. ITERs in POWER).
- Faculty are much more likely to complete assessment forms if they are on an easy-to-use server (e.g. Google Drive) that the resident provides at time of assessment.

The top lessons re: resident engagement, success, and participation in competency-based curriculum:

- In the traditional model, residents were expected to read a book at the beginning of a rotation and to be present as an apprentice.
- With the CBME residency program, residents have a detailed curriculum map, with a clear set of objectives about what they need to read and study, and what they will be evaluated on.
- The new curriculum residents are given more direction, especially at the beginning of a block/rotation.

- Clarity of program expectations (re: map, assessments, outcomes) allows residents to be very focused and achieve the objectives quite well. The expectations are quite consistent across each resident (i.e. more consistent “end product” of performance across residents on same module).
- Residents are more responsible for their own education. This includes having to help organize meetings (for going over objectives of module and assessments) with supervisory staff for beginning, middle, and end of module time points.
- Residents are responsible for obtaining evaluations in a timely fashion.
- Residents receive more feedback than ever before (mid-point and end-point multiple assessments).
- The new curriculum is more responsive and highlights residents in difficulty and professionalism earlier.
- A highlight is early identification of residents who need more help. Not usually needing formal remediation, first efforts are in the form of enriched education involving more time.
- Residents appear pleased with the competency-based program.
- In each module, especially in the early stages, residents are able to master specific focused activities (e.g. patient care management) and procedures (e.g. specific types of surgical procedures from start to end, first basic, then more complicated procedure or more complex patients)
- Patient care by residents in early modules is better, likely with higher patient satisfaction and better judgement from residents on what they can or cannot do.
- Senior residents have reported being, and also appear to be, more confident when writing their RCPSC exams because they’ve had practice writing intense multiple choice exams before their final.
- Junior residents also have reported and appear pleased with the competency-based program.
- In the past, junior residents spent a lot of time doing things that had little bearing on their future practice (e.g. high volume of off-service rotations), whereas now they start building their surgical skills early and are given opportunities to do more surgeries when they demonstrate they are ready.
- All residents, but especially junior residents, get more feedback on intrinsic CanMEDS competencies.
- Started out using paper forms, but were quickly overwhelmed. Now using online forms, but need more integrated systems for all forms (i.e. different forms in different online systems).

7.6. Appendix 6. – Palliative Medicine – Resident Focus Group

The residents felt that, overall, their experiences with the implementation of EPAs were positive. These residents participated in a pilot project that involved two or three EPAs. The fact that it was a pilot project made it somewhat challenging and made it feel like the EPA assessments were "extra work." Two residents from the pilot project are now faculty who are working on EPA development for the program.

Those who are currently working on the EPAs noted that the direction the program is moving in is to include a few assessments or encounters per month, all related to the same entrustable activity, but only on the core rotations.

The **top assessment lessons re: residents** in CBME using EPAs:

- EPAs need to follow the natural work flow as much as possible. So, rather than creating new tasks, they should be a reflection of the work that is already being done and the assessment that should already be done on a regular basis.
- There's a need to distinguish between EPAs and skills that don't need to be observed or developed over time.
- Not all activities are amenable to an EPA assessment tool (e.g. how to bill, QI project). These can be more of a checklist.

The **strengths to residents in** competency-based curriculum using EPAs:

- Benefit was that direct observation actually occurred.
- EPA tool was a good way to get more valuable, robust feedback.
- Feedback based on direct observation was more useful, as it was more specific, more detailed.
- EPA tools give a nice framework or structure for providing feedback. And so, "the feedback is richer as a result because you can actually go through the different domains in terms of what was observed, rather than just a general gestalt of 'I think that went well'."
- Teachers were really invested in this pilot and they really saw the value in doing it.
- Residents generally agreed that "the concept of EPAs and the concept of moving along the spectrum, not in terms of 'are you excelling at the skill,' but 'are you at a point where you can do this independently without supervision' is a better way to conceptualize learning."
- EPA tool used was easy to learn (i.e. 3 minutes to be oriented to the content and process of EPA assessments).

The **challenges to residents** in competency-based curriculum using EPAs:

- The challenges noted were in relation to their participation in the pilot program rather than the EPA work itself.
    - "I looked at it as not really part of my mainstream evaluation, but kind of this extra thing that was being added on, and sometimes that meant extra work."
    - "So, there were numerous things that we had to do during the rotation, and sometimes, it felt artificial, in that we had those mandatory other forms that we had to fill out, which also had to be supervised."
    - "So, because those, quote/unquote, 'counted,' some preceptors would give priority on that. And then, inevitably, we found ourselves in the second or third week, or approaching the fourth week, being like, okay, I have to now watch you do three extra consults."
- Had to do consultations and case review forms in addition to EPAs and end evaluations.
- Improved the EPAs. Some assessments were scrapped as EPAs (e.g. Most Responsible Physician [MRP]). Some EPA lists/tools were edited to flow with work.
- Need to be sure EPAs add value and don't just create paperwork.
- We have changed how we assess residents with the consolidation the number of different evaluation forms and focusing on what is best done using EPA, and what should be done in a different manner.
- What is the correct number of EPAs and frequency? Perhaps once a month. Perhaps once a week for three different months of the year.

7.7. Appendix 7. – Orthopaedic Surgery – Resident Focus Group

The top assessment lessons re: residents in CBME:

- Residents described their experience as having to "hit the ground running," with little or no time to adjust to residency. Although they hadn't participated in a traditional model residency program, they felt the competency-based curriculum started off quicker and gave more responsibility to residents in the early stages.
- Residents had to adjust to the "mandatory" nature of staying up to date with all the content. They said it wasn't difficult, they just needed to do daily studying.
- Were ready (prepared) from undergrad studies to take responsibility for education and learning.
- They "had to study pretty much on a daily basis and pay attention to everything."
    - "It wasn't just an assessment of our communication skills, which are focused on in the competency-based curriculum when you first start out."
    - "It was all the knowledge as well."
- As new resident, junior resident, they needed to manage their own expectations as they were not good at many of the skills and procedures they were trying. At first was hard to adjust to the effort required to improve performance and come to grip with the reality that they were not good at some or many skills.
- Relied on the online and other directed reading content provided by faculty. Content was pretty balanced.
- Expectations were quite balanced. Residents had two formal assessments for each module and they were evaluated on procedures as well during the course of the module, so they received four or five formal assessments per module.
- Faculty were variable in their enthusiasm.
- This number seemed to be a good balance between getting evaluation fatigue and getting enough feedback to feel confident.
- At the beginning of their training, the module leaders (i.e. faculty) were responsible for organizing assessments.
- Assessments take time to secure/schedule.
- Early on, taking responsibility, including the logistics, was very fatiguing to the residents.

- The program changed over the years and residents became more involved in their assessments. Assessments are now online, so they are easier to fill out. Residents still need to ask for assessments.

- Program is at saturation of assessments: for a period of three to four months there is signoff of one written, one observed examination (done correctly), one or two completed procedure(s) (done correctly from start to end). Program is at the limit of the assessments that are doable, given effort required by residents to get the assessments.

HINT and TIPS from residents who were in a new CBME (to other residents):

- Have a firm understanding of what's required from each module. Make a checklist of evaluations, procedures, etc.

- The support of your senior residents is invaluable to junior residents.

- Do not focus on trying to advance quickly. It is very stressful for everybody and the logistics get very complicated if you try to go too fast or move into areas you haven't accomplished. The most important thing about this curriculum is the assessments.

- "I think I benefited a lot from being assessed, getting the feedback on how things are going, and getting confidence from that, that you are in fact doing well, and not just showing up for the work that you needed to do and just going through things without really learning as much as you should."

Residents' view on the strengths of CBME:

- Residents helped improve the program. They were encouraged to give feedback to the program.

- Residents received a lot of feedback, which was mostly positive about how they were progressing. It built up their confidence early on.

- Now, residents like feedback, want feedback

    - Helps with early detection of problem areas. Residents used to be able to get pretty far in their program and not hear until their later years that they were not doing so well. Now residents are getting more feedback early on, so they know where they are and what they have to work on.

    - Residents believe that the residents' experience more learning in the early years than in the traditional model. "I don't know if in the end it evened out, but certainly in the beginning as a learning experience I think it was better."

Residents' view on the challenges of the competency-based residency program:

- The program was constantly changing, especially at beginning.
- Not all felt that the modules were equal in difficulty, making it difficult to achieve the content from some modules more than others.
- Although residents felt they were able to accelerate through some modules, getting the evaluations and assessments required completed (by faculty) slowed them down some. It was very difficult to try to advance/accelerate and "save time" (e.g. a week or two) because of the logistics of scheduling evaluations.
- Logistics in the early version were difficult at times. Sometimes they would go to three different hospitals in one week, which made the commute, getting comfortable with the environment, and getting to know the staff challenging. This schedule issue likely has been addressed.