

It's a Marathon, Not a Sprint: Rapid Evaluation of Competency-Based Medical Education Program Implementation

Andrew K. Hall, MD, FRCPC, MMed, Jessica Rich, PhD,
J. Damon Dagnone, MD, FRCPC, MSc, MMed, Kristen Weersink, MD, MSc,
Jaelyn Caudle, MD, FRCPC, EMDM, Jonathan Sherbino, MD, FRCPC, MEd, FAcadMED,
Jason R. Frank, MD, FRCPC, MA(Ed), Glen Bandiera, MD, FRCPC, MEd, and Elaine Van Melle, PhD

Abstract

Purpose

Despite the broad endorsement of competency-based medical education (CBME), myriad **difficulties** have arisen in **program implementation**. The authors sought to evaluate the fidelity of implementation and identify early outcomes of CBME implementation using Rapid Evaluation to facilitate transformative change.

Method

Case-study methodology was used to explore the lived experience of implementing CBME in the emergency medicine postgraduate program at Queen's University, Canada, using iterative cycles of Rapid Evaluation in 2017–2018. After the intended

implementation was explicitly described, stakeholder focus groups and interviews were conducted at 3 and 9 months post-implementation to evaluate the fidelity of implementation and early outcomes. Analyses were abductive, using the CBME core components framework and data-driven approaches to understand stakeholders' experiences.

Results

In comparing planned with enacted implementation, important themes emerged with resultant opportunities for adaption. For example, lack of a shared mental model resulted in frontline difficulty with assessment and feedback and a concern that the granularity of competency-focused assessment may

result in "missing the forest for the trees," prompting the return of global assessment. Resident engagement in personal learning plans was not uniformly adopted, and learning experiences tailored to residents' needs were slow to follow.

Conclusions

Rapid Evaluation provided critical insights into the successes and challenges of operationalizing CBME. Implementing the practical components of CBME was perceived as a sprint, while realizing the principles of CBME and changing culture in postgraduate training was a marathon requiring sustained effort in the form of frequent evaluation and continuous faculty and resident development.

Broad concerns about the quality of health care provision have stimulated a "call to action" in postgraduate medical education and a massive paradigm shift toward competency-based medical education (CBME).¹ CBME is defined as "an outcomes-based approach to the design, implementation, assessment, and evaluation of medical education programs, using an organizing framework of competencies."² Competency frameworks are already well integrated into many training programs around the world,³ but the integration and implementation of CBME in its

entirety has been challenging,^{4,5} As with any transformative innovation, its success is dependent upon the efforts of educational leaders to deliberately shift the culture of a program by affecting a change in assumptions, behaviors, processes, and products over time.^{6–8} Due to the magnitude of this change effort, there is a strong tendency of the system to revert to the status quo.⁹ Consequently, transformational change requires systematic efforts to evaluate (and respond to) the strengths and challenges of early implementation efforts.¹⁰ Medical education leaders clearly recognize this: it has been observed that the "evaluation of CBME in a longitudinal, iterative process is essential and is a responsibility of all organizations implementing medical education reform."¹¹

The Royal College of Physicians and Surgeons of Canada (Royal College) is currently implementing a specific CBME model, termed Competence By Design (CBD),¹¹ across all 67 specialty and subspecialty postgraduate training programs in Canada. Emergency medicine (EM) was scheduled to

implement CBME on a national level starting July 1, 2018. In 2015, a local decision was made however, for all postgraduate training programs at Queen's University to implement a similar model of CBME simultaneously as of July 1, 2017.¹² Accordingly, the Queen's University EM postgraduate program provided an ideal opportunity to study local implementation of the nationally derived curriculum, offering the potential for informing the national rollout to take place the following year.

The challenge was to find an approach that would allow for the evaluation of CBME as a transformational change initiative—an approach that could monitor whether or not substantial shifts were occurring in the desired direction, over time, and if not, to identify any required course corrections. In the field of program evaluation, Transformative Evaluation and Research is a methodology specifically developed for initiatives focused on addressing issues of human rights and social justice.¹³ To our knowledge, there is not a specific method that focuses on evaluating

Please see the end of this article for information about the authors.

Correspondence should be addressed to Andrew K. Hall, Department of Emergency Medicine, Queen's University, Victory 3, Kingston General Hospital, 76 Stuart St., Kingston, ON, Canada K7L 2V7; telephone: (613) 548-2368; email: andrew.hall@queensu.ca; Twitter: @AKHallMD.

Acad Med. 2020;95:786–793.

First published online October 15, 2019

doi: 10.1097/ACM.00000000000003040

Copyright © 2019 by the Association of American Medical Colleges

Supplemental digital content for this article is available at <http://links.lww.com/ACADMED/A762>.

transformational program change. Rapid Evaluation, however, is “an interactive and adaptive management process in which internal operational results and external environmental feedback are used together in an iterative process to test and improve on an initiative’s overall strategy.”¹⁴ Rapid Evaluation relies on specification of the nature and extent of the intended change and so can allow for an in-depth understanding of whether or not an innovation is achieving the desired transformation. Furthermore, understanding if an innovation is being implemented as intended, also known as fidelity of implementation,¹⁵ allows for identification of areas where course correction may be required. Therefore, Rapid Evaluation enables both the evaluation of CBME as a transformative change initiative and an understanding of how CBME implementation relates to achieving desired outcomes.¹⁶

In this article, we describe the use of Rapid Evaluation as a novel approach to evaluating CBME as a transformational change initiative at the program level, using EM at Queen’s University as a worked example. The evaluation focused on measuring the fidelity of implementation and identifying early outcomes of implementation, both anticipated and unanticipated.

Method

We used a case-study research methodology¹⁷ to explore the lived experience of implementing CBME in the Queen’s University EM program using iterative cycles of Rapid Evaluation. Building on the previously described Rapid-Cycle Evaluation approach,¹⁰ our Rapid Evaluation approach focused on capturing and providing timely evidence to engage in a process of evolutionary adaptation (Figure 1). In this model,¹⁸ the evaluator starts with an explicit description of the nature of the change, including the context and anticipated outcomes appropriate to the stage of implementation. This is followed by collection of information about the actual implementation. These data can then be used to describe the actual implementation processes and outcomes to determine if the innovation is being implemented as intended and to capture anticipated and unanticipated outcomes.¹⁹ Feedback is then immediately provided to stakeholders, and any

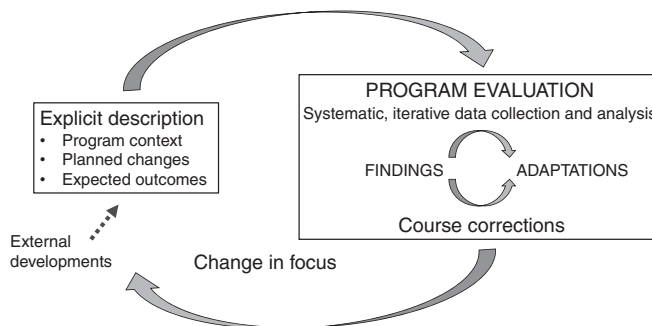


Figure 1 Rapid Evaluation: Process of evolutionary adaptation toward deep systems change. Adapted from Van Melle.¹⁸

required course corrections are identified and implemented. The evaluation is then repeated at predetermined intervals, allowing for timely ongoing monitoring of implementation.

To create an explicit description of the critical features and intended outcomes, we used the core components framework (CCF).²⁰ The CCF organizes the building blocks of a CBME program into 5 categories: outcome competencies, sequenced progression, tailored learning experiences, competency-focused instruction, and programmatic assessment. The CCF was interpreted in the unique context of Queen’s University EM training program to generate an explicit description of what CBME should look like if implemented as intended, along with anticipated short-term outcomes.

Before commencing data collection, we received study approval from the Queen’s University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board (Emed-262-17). We engaged in 2 Rapid Evaluation cycles after implementation of CBME (post-implementation). Data

were acquired at 3 months (September 21–October 5, 2017) and 9 months (February 26–March 9, 2018) post-implementation to measure the actual implementation, using focus group interviews of key stakeholders (residents, faculty members, academic advisors, CBME lead, program director [PD]) with up to 5 participants per group. We chose these intervals of evaluation to ensure stakeholders were rapidly engaged post-implementation (3 months) and to allow for stakeholders to perceive subsequent adaptations before the second evaluation cycle (9 months). Table 1 presents a summary of our participant groups and sample sizes. We chose participant groups to ensure all potential stakeholder groups were represented, and all potential focus group participants from each group were invited to participate. Interviews and focus groups were moderated by one member of our research team (J.R.), who was not involved in the program leadership or implementation process. Interview questions at 3 months focused on exploring stakeholders’ perceived strengths and challenges associated with their role(s) in the program, experiences and concerns with program

Table 1

Interview and Focus Group Participants, From a Study of CBME Program Implementation Using Rapid Evaluation, Queen’s University Department of Emergency Medicine, 2017–2018

Stakeholder focus group members	No. 3-month participants (no. invited)	No. 9-month participants (no. invited)
Program director	1 (1)	1 (1)
CBME lead	1 (1)	1 (1)
PGY-1 residents	3 (4)	4 (4)
PGY 2–5 residents	5 (17)	6 (17)
Faculty members ^a	8 (35)	6 (35)
Academic advisors	3 (4)	4 (4)

Abbreviations: CBME, competency-based medical education; PGY, postgraduate year.

^aFaculty members were divided into 2 focus groups.

implementation, and suggestions for refining ongoing program development and implementation. The 9-month interview questions were informed by the 3-month emergent findings and mapped to the CCF to capture emerging themes related to the critical features of CBME. Interview guides are available in Supplemental Digital Appendices 1 and 2, available at <http://links.lww.com/ACADMED/A762>.

During data collection, saturation²¹ was achieved after one round of meetings with each stakeholder group. No new insights were emerging from comments within or across the stakeholder groups. At this point, theoretical saturation was determined by posing and answering the following question as a research team: “based on the CCF, do we have sufficient data to illustrate emergent theme(s) relevant to each core component?” We used the second focus group with faculty at both 3 and 9 months to discuss emerging themes and to check for counterevidence of divergent insight(s). With the permission of participants, interviews were audiorecorded, transcribed verbatim by an external transcription service, and checked for accuracy by one member of our research team (J.R.). The overall approach to data collection and analyses was abductive, allowing for themes and novel insights to emerge in relation to the CCF. Within qualitative research, abduction involves a combination of data-driven inductive analysis and theory-based deductive analysis to make plausible inferences about perceived consequences and their antecedents.²² We used NVivo software, version 11.4.3 (QSR International Ltd., Melbourne, Australia) to annotate and code the dataset. Following thematic analysis of 3-month interviews, a technical report was generated and immediately disseminated to all local and national stakeholders via email. The 3-month technical report served dual purposes: member checking data by local stakeholders and rapid spread of information to inform ongoing local and national implementation.

Results

Description of ideal implementation: Context, changes, and expected outcomes

A summary of the expected outcomes of CBME implementation, as defined

using the CCF, is presented in Table 2. The Queen’s University EM training program was designed in the model of CBD as outlined by the Royal College, in which training EM physicians build upon the skills acquired in medical school to develop discipline specific competency within 4 sequential stages of training.²³ Derived by the EM Specialty Committee, the documents defining the program relevant to CBME included the entrustable professional activities (EPAs) and their component milestones for EM²⁴ and the required training experiences for EM.²⁵ Note that in contrast to the use of milestones to organize competency by the Accreditation Council for Graduate Medical Education (ACGME),²⁶ in CBD, competence is defined by stage-specific EPAs each with component milestones.²³

This EM postgraduate program is one of 18 five-year residency training programs across Canada, accepting 4 residents per year. During the study period, there were 35 full-time EM faculty working in the physician group.

The program was administered by a PD, assistant PD, and CBME lead and supported by a full-time administrative assistant. Other unique roles included academic advisors, who functioned in a longitudinal coaching role with a limited group of residents. As well, a CBME resident lead assisted with resident development and liaised between program administration and residents. The key processes of the implementation strategy are outlined in List 1.

We asked EM residents to acquire 1 or 2 assessments per shift using EPA-based electronic assessment forms. All workplace-based assessments were performed and tracked using a purpose-built mobile online platform (Elentra, Kingston, Ontario, Canada). Assessment forms included a detailed description of the EPA being assessed, the relevant milestones, one of 2 entrustment rating scales,^{27,28} and a mandatory narrative feedback box. Each resident reviewed their electronic dashboard with their academic advisor quarterly to monitor progression and facilitate the development of resident personal learning plans (PLPs).²⁹ Immediately following the academic advisor meetings, the EM competence committee (made up of the PD, CBME lead, 4 academic advisors) met to review all trainees’

assessments and make consensus decisions around resident progression within and between stages of training. The decision-making processes were modeled after those described by the Royal College Competence Committee Guidelines³⁰ and the ACGME.³¹ In this context, each frontline EPA-based assessment was alone a low-stakes assessment, but it was the aggregate and synthesis of these low-stakes assessments that informed high-stakes decisions by the competence committee.

Measurement of actual implementation and resultant adaptations

Emergent themes and resultant program adaptations from the 3- and 9-month data are organized according to the CCF²⁰ and summarized in Table 2. The following categories include examples of quotes to further describe important findings.

Outcome competencies. Initial implementation strategies resulted in variable stakeholder understanding of the principles of CBME. Stakeholders initially adopted a critical stance regarding CBME. As one faculty member explained, “We’re kind of making [training] much more descriptive and defining it in pedagogical terms, but I’m not sure if it’s going to be any different in the end.” After subsequent additional faculty development, the critical stance shifted toward a cautious optimism that CBME would improve training for the better. One academic advisor/competence committee member likened CBME implementation to the adoption of an electronic medical record: “Probably half the department was really vocal against it. . . . And if you look at it today, we would say ‘how did we ever function without it?’”

Sequenced progression. Contributing to a critical stance toward CBME was early frustration with the concept of entrustment and the assessment of individual stage-specific EPAs and milestones in situ. Faculty reported that selecting an EPA to assess, using an entrustment scale to assess part of a complex task, and making judgments about the achievement of individual milestones, all while managing clinical demands, were quite overwhelming. Overall, a lack of shared mental model regarding the nature and purpose of stage-specific EPAs and entrustment of partial tasks was apparent. Even

Table 2

Core Components, Expected Outcomes, Themes Emerging From Stakeholder Interviews, and Program Adaptations, From a Study of CBME Program Implementation Using Rapid Evaluation, Queen's University Department of Emergency Medicine, 2017–2018

Core component	Expected outcomes (summarized)	3-month themes	3-month adaptations	9-month themes	9-month adaptations
Outcomes competencies	<ul style="list-style-type: none"> Stakeholders understand CBME, entrustment, and EM EPAs 	<ul style="list-style-type: none"> Variable stakeholder understanding of principles of CBME and framework 	<ul style="list-style-type: none"> Targeted faculty/resident development 	<ul style="list-style-type: none"> Cautious optimism about CBME Need for further revision of EPAs 	<ul style="list-style-type: none"> Targeted faculty/resident development Collection of EPA-focused feedback for future revision
Sequenced progression	<ul style="list-style-type: none"> Competencies are sequenced via stage-specific EPAs and associated milestones for use by stakeholders to define progression, direct learning, and organize assessment 	<ul style="list-style-type: none"> Lack of shared mental model relating to scope of EPAs, stage specificity, partial task assessment, and purpose/utility of milestones 	<ul style="list-style-type: none"> Revision of milestones and assessment forms deemphasizing milestones 	<ul style="list-style-type: none"> Frontline difficulty with entrustment of stage-specific partial clinical tasks Improved understanding of role of milestones for formative feedback 	<ul style="list-style-type: none"> CC focus on narrative feedback understanding variable frontline stage-specific entrustment scores
Tailored learning experiences	<ul style="list-style-type: none"> EM required training experiences are implemented with personalized additions or modifications, and residents engage with AAs to direct learning via PLPs 	<ul style="list-style-type: none"> Questioned utility of PLPs Hope for flexibility in training experiences 	<ul style="list-style-type: none"> AA-mediated PLP engagement and operationalization 	<ul style="list-style-type: none"> Surface-level engagement with PLPs 	<ul style="list-style-type: none"> Required PLP follow-up and accountability with AAs
Competency-focused instruction	<ul style="list-style-type: none"> Faculty (on/off service) directly observe residents to provide feedback relevant to EPAs and clinical context Residents are responsible for tracking their progression to solicit targeted feedback 	<ul style="list-style-type: none"> Concerns about giving and receiving quality feedback Confusion related to goals of off-service rotations 	<ul style="list-style-type: none"> Feedback training for faculty and residents Development and dissemination of clear off-service assessment plans 	<ul style="list-style-type: none"> Understanding that CBME may facilitate but does not guarantee provision and documentation of constructive feedback Questioned feasibility of off-service competency-focused instruction 	<ul style="list-style-type: none"> Feedback training for faculty and residents Simplified off-service assessment plans
Programmatic assessment	<ul style="list-style-type: none"> Residents solicit frequent and broad assessment Faculty use entrustment scoring to document observations and provide workplace-based assessment CC reviews electronic aggregated EPA-focused assessments and additional assessment data to objectively make decisions about resident progression 	<ul style="list-style-type: none"> Confusion about roles (PD, CBME lead, AA) Critical nature of effective data visualization Concern that CBME requirements are being added onto rather than replacing old system requirements Concerns about granularity of EPA-focused assessment resulting in lack of overall global assessment and reassurance 	<ul style="list-style-type: none"> Roles clarification and dissemination Creation of EPA "Report Cards" for easy visualization Resident debriefing related to CBME implementation Reinitiation of informal end-of-shift global feedback 	<ul style="list-style-type: none"> Improved understanding and delineation of roles, but need for further communication amongst stakeholders Confusion related to CC processes for making progression decisions Concern that important critical performance information is not yet being documented due to persistence of old assessment habits Enhanced data visualization has been critical to effective AA and CC decision making and communication 	<ul style="list-style-type: none"> Development of CC communication plan and clarification with residents Revision and dissemination of clear criteria for promotion and progression Targeted in situ faculty development Further demands of electronic platform for interactive and summarized data

Abbreviations: CBME, competency-based medical education; EM, emergency medicine; EPA, entrustable professional activity; PD, program director; AA, academic advisor; CC, competence committee; PLP, personal learning plan.

List 1

Key Processes of CBME Implementation, From a Study of CBME Program Implementation Using Rapid Evaluation, Queen's University Department of Emergency Medicine, 2017–2018**Administrative transition**

- CBME lead delegation (May 2015)
- Postgraduate CBME workshops (bimonthly May 2015 to July 2017)
- Academic advisors delegation and training (January to June 2017)
- Competence committee development (quarterly September 2017 to June 2018)
- Program administrator training (twice annually September 2015 to May 2017)
- Institutional electronic portfolio (Elentra online platform) implementation (September 2015)

Faculty transition

- EM grand rounds:
 - Introduction to CBME (September 2015)
 - Roles, EPAs, Entrustment (January 2016)
 - EM EPAs, Transition (January 2017)
- EM department meeting presentations:
 - CBME for Front-Line Faculty (May 2016)
 - EPAs, Entrustment (May 2017)
- Practical faculty development workshops (May 2017):
 - 5 sessions for 35 faculty
 - 2 hours each, 4–8 faculty per session
- Post-implementation faculty development:
 - Changing feedback culture (May 2018)

Resident transition

- Resident CBME lead delegation (January 2017)
- Practical resident training sessions (May 2017):
 - 2 sessions for 20 residents
 - 2 hours each, 4–16 residents per session
- Post-implementation resident training:
 - Giving and receiving feedback (November 2017)

Abbreviations: CBME, competency-based medical education; EM, emergency medicine; EPA, entrustable professional activity.

those faculty who understood the goals of this stage specificity agreed that it was challenging to make entrustment decisions that were criterion referenced based on a portion of a complex task. As one faculty member explained, “Our brains are programmed to evaluate somebody based on what a perfect performance would be for an attending and constructive feedback relates to what the resident could or should do differently.”

Across faculty members, the cognitive effort required to make decisions about the achievement of individual milestones was specifically perceived as cumbersome. Further, the results of individual milestone assessments observed were perceived as providing little information for academic advisors to inform residents’

PLPs or for competence committee members to make formal progression decisions. Consequently, many faculty members disengaged from directly assessing milestones, and a decision was made by program leaders (CBME lead and PD) to make milestones an optional component of the assessment.

Tailored learning experiences. After 3 months of training, junior residents expressed appreciation for early immersion in EM, which was a change from the prior approach to early off-service experiences. Further, they expressed optimism about negotiating rotations in the later stages of training, despite not perceiving any customization of the training experience yet. Residents initially had mixed views on the value of PLPs, which are thought to

be important facilitators of tailored learning experiences.²⁹ Junior residents found PLPs to be “very useful,” as one participant noted, in helping to prioritize opportunities for direct observation. Yet a senior resident’s observation that the PLPs were “a check box; just more paperwork process to prove that we’re doing CBME” seemed representative for advanced trainees. From the perspective of program administrators, however, PLPs were perceived to have value in directing enhanced learning opportunities; one such comment was, “there’s already been a change in course or path for some people.”

Competency-focused instruction.

Both faculty and residents were quick to recognize that while EPAs and milestones may help to encourage criterion-referenced feedback, there was no guarantee that feedback would be developmentally constructive. As one competence committee member explained, “giving and receiving constructive feedback is not a comfortable thing for anyone. Implementing a new system isn’t going to change anyone’s behavior.” This sentiment was also shared by program leadership, with one participant explaining that the biggest hurdle was “getting the culture to change where feedback is given honestly and accepted honestly.” This prompted substantial efforts and adaptations in the form of faculty and resident development activities relating to the provision, documentation, and acceptance of constructive feedback. After 9 months of implementation, program stakeholders agreed that despite leadership efforts, most faculty continued to shy away from giving and documenting constructive feedback. One EM faculty member explained, “even though I’m very motivated to provide targeted feedback, your brain just naturally thinks globally ... you have to actually make that cognitive step from your overall gestalt about somebody down to the task, and then really think about the very specifics of the task in order to give good feedback. That’s not easy, and I still fail sometimes.”

Programmatic assessment. Programmatic assessment requires the coordinated efforts of multiple stakeholders, each having important and complementary roles and responsibilities for formative and summative assessment.³² CBME

requirements were initially perceived as being added onto rather than replacing old system requirements. While e-portfolio summary-reporting mechanisms were in development, they were described as a “frustrating” and “make-work” task for residents and faculty to manually track the number and results of individual performance assessments. Program leaders described early competence committee meetings as having “a lot of clicking, and not as much talking.” Further, the addition of 2 new roles—the CBME lead and academic advisors—created overlap with the portfolio of the PD as well as confusion among stakeholders regarding who should be informed of program changes and resident performance information. This prompted revision, clarification, and dissemination of role descriptions for all stakeholders.

Through the evaluation cycles, stakeholders transitioned from cautiously navigating to co-developing and refining assessment roles and responsibilities. Most confusion and subsequent role-revision centered around the role of the academic advisor and the decision-making processes of the competence committee. For example, as one academic advisor explained, “the academic advisors have a blurred model of coaching, mentoring, and evaluating, and they don’t always mesh.” Further, when asked to reflect on the inner working of competence committee processes, members were very clear that “it’s generally a learning process.”

Discussion

We have described the use of Rapid Evaluation to examine the fidelity of implementation and evaluate the short-term outcomes post-implementation of CBME at the individual program level. While in theory there is merit to adopting a CBME model,¹ operational challenges in the Queen’s University context threatened successful implementation. In considering the perspectives of multiple stakeholder groups, and implementing adaptations to our initial design, we have learned several important lessons.

Lesson 1: Implementing the practical components of CBME is the “sprint”

In the early stages of planning for and implementing CBME, the focus was on structure: how were we going to

get all the practical and functional aspects of CBME in place so that the system got up and running? Having structures in place to support the core components was the bare minimum. Essential structures included technology, educational support, and program champions. An electronic portfolio with data visualization, educational expertise in assessment and evaluation, and institutional and program-level leadership in CBME implementation were needed to implement change. We have learned, however, that just because CBME is “up and running” doesn’t mean that the system is functional or achieving the intended aims immediately. Despite having structures in place to support programmatic assessment, our system of assessment was limited by faculty members’ hesitation to document constructive feedback. When this occurs, evidence-informed decision making by the competence committee may be undermined.³³ Guidance for ongoing learning and progress/promotion decisions are only as good as the evidence upon which they are made.³⁴ The challenges with providing honest assessment and constructive feedback are not new,^{35,36} and we should not have expected them to disappear with the implementation of CBME. Unique strategies for faculty development, dedicated faculty assessors in the EM department, or more frequent assessment in simulated settings may have been of benefit to increase the validity and reliability of frontline assessment.

Lesson 2: Realizing the core components of CBME is the “marathon”

Change is difficult, and sustaining change is even more challenging.³⁷ Thwarting reductionism in CBME implementation requires sustained effort.^{1,38} Our findings suggest that in the isolated assessment of individual EPAs and milestones we may be risking the “forest for the trees.” Even if milestones and EPAs can provide observable pieces of performance information (e.g., EPA C1: “Resuscitating and coordinating care for critically ill patients”²⁴), our faculty and residents perceived a notable absence of overall evaluation when asked to focus on targeted EPA-focused assessment only. The long-standing assessment-mediated end-of-shift discussions about “how things are going overall” proved to be more valuable than previously thought.

With faculty focusing on making judgments about the achievement of individual milestones and EPAs, we may have been risking evidence supporting the bigger picture. Whether this observation suggests an EM-specific end-of-shift global assessment ritual,³⁹ or is transferrable across contexts, remains to be determined. With expected delayed gratification, the perceived benefits of our implementation may not be apparent until several years post-implementation, as experienced by others who have implemented CBME at our own institution.⁴⁰ Expecting faculty and residents to provide, recognize, and act upon criterion-referenced constructive feedback—without educational support—is unrealistic.⁴¹ These skills are developed through targeted instruction, practice, and feedback.⁴² We have learned that CBME will not change the culture of learning in our program by itself but will require persistent faculty and resident development.

Lesson 3: There is value in using Rapid Evaluation for identifying, monitoring, and assessing ongoing change

Our model of Rapid Evaluation, as a developmental approach to evaluating CBME implementation, has been a worthwhile strategy for documenting innovation and generating real-time evidence to support ongoing program improvement. Further, our program participants valued the opportunity to discuss their experiences with CBME during focus groups and were interested in receiving updates as to how their feedback was informing ongoing change. When program stakeholders are given the opportunity to share what’s (not) working on the ground, they become increasingly invested as participants in the process of ongoing program improvement.⁴³ This momentum was crucial for mitigating the inevitable post-implementation dip in morale where stakeholders’ enthusiasm for staying the course of change started to fade.⁹

Limitations

This study has several limitations. The primary limitation is that the context in which this study took place may be unique, since this program is nested within an organization implementing CBME concurrently across all residency programs. Further, this study only focused on one specialty, at one

institution. Consequently, our findings may be limited in their transferability. Another limitation is that the data collection was based primarily on interviews, not direct observations, and as such there may be a gap between what was reported and what was being done. As well, even though a single member of the research team moderated the interviews and analyzed the data, multiple rounds of data collection and member checking data with participants helped to increase the credibility of the findings. Lastly, Rapid Evaluation, with its emphasis on collecting data on an ongoing basis, tends to be resource intensive and so it may prove challenging for other programs to adopt this approach.

Conclusions

Exploring the lived experience of implementing CBME at the program level with Rapid Evaluation has provided critical early insights regarding the fidelity of implementation, early outcomes post-implementation, and the successes and challenges of operationalizing CBME. There was great value in using Rapid Evaluation for identifying, monitoring, and assessing ongoing change post-implementation, with a crucial benefit of mitigating the stakeholders' resistance to change and spurring enthusiasm for staying the course. Implementing the core practical components of CBME was perceived as a sprint, while realizing the principles of CBME and changing culture in postgraduate training is clearly a marathon. This long-term goal will require sustained effort, including persistent faculty and resident development in the process of evolutionary adaptation toward deep systems change.

Acknowledgments: The authors would like to thank all of the faculty and residents at Queen's University Emergency Medicine for their willingness to participate in interviews and focus groups.

Funding/Support: This study was funded by a Southeastern Ontario Academic Medical Organization (SEAMO) Endowed Scholarship and Education Fund grant.

Other disclosures: None reported.

Ethical approval: This study received approval from the Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board (Emed-262-17).

Previous presentations: Limited preliminary findings from this study were presented as a poster at the 2018 Canadian Association of Emergency Physicians annual conference, May 28, 2018, Calgary, Alberta, Canada, and as a Technical Report submitted to the Royal College Emergency Medicine Specialty Committee, November 21, 2017. More complete findings were presented as an oral presentation at the 2018 World Summit on Competency-Based Medical Education (CBME), Basel, Switzerland, August 24, 2018, and as an oral presentation at the 2018 International Conference on Residency Education, October 20, 2018, Halifax, Nova Scotia, Canada.

A.K. Hall is associate professor, Department of Emergency Medicine, Queen's University, Kingston, Ontario, Canada, and clinician educator, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario, Canada; ORCID: <http://orcid.org/0000-0003-1227-5397>.

J. Rich is research associate, Faculty of Education, Queen's University, Kingston, Ontario, Canada; ORCID: <http://orcid.org/0000-0001-7409-559X>.

J.D. Dagnone is associate professor, Department of Emergency Medicine, and CBME faculty lead, Postgraduate Medicine, Queen's University, Kingston, Ontario, Canada; ORCID: <http://orcid.org/000-0001-6963-7948>.

K. Weersink is a resident, Department of Emergency Medicine, Queen's University, Kingston, Ontario, Canada; ORCID: <http://orcid.org/0000-0002-0325-3172>.

J. Caudle is assistant professor, Department of Emergency Medicine, Queen's University, Kingston, Ontario, Canada.

J. Sherbino is professor, Division of Emergency Medicine, Department of Medicine, and assistant dean, Health Professions Education Research, Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada.

J.R. Frank is director, Specialty Education, Royal College of Physicians and Surgeons of Canada, and associate professor and director, Educational Research and Development, Department of Emergency Medicine, University of Ottawa, Ottawa, Ontario, Canada; ORCID: <http://orcid.org/0000-0002-6076-0146>.

G. Bandiera is professor, Department of Medicine, and associate dean, Postgraduate Medical Education, University of Toronto, Toronto, Ontario, Canada.

E. Van Melle is senior education scientist, Royal College of Physicians and Surgeons of Canada, Ottawa, Ontario, Canada, and adjunct faculty, Department of Family Medicine, Queen's University, Kingston, Ontario, Canada.

References

- Holmboe ES, Sherbino J, Englander R, Snell L, Frank JR; ICBME Collaborators. A call to action: The controversy of and rationale for competency-based medical education. *Med Teach.* 2017;39:574–581.
- Frank JR, Mungroo R, Ahmad Y, Wang M, De Rossi S, Horsley T. Toward a definition of competency-based education in medicine: A systematic review of published definitions. *Med Teach.* 2010;32:631–637.
- ten Cate O, Snell L, Carraccio C. Medical competence: The interplay between individual ability and the health care environment. *Med Teach.* 2010;32:669–675.
- Holmboe ES, Yamazaki K, Edgar L, et al. Reflections on the first 2 years of milestone implementation. *J Grad Med Educ.* 2015;7:506–511.
- Caverzagie KJ, Nousiainen MT, Ferguson PC, et al; ICBME Collaborators. Overarching challenges to the implementation of competency-based medical education. *Med Teach.* 2017;39:588–593.
- Ferguson PC, Caverzagie KJ, Nousiainen MT, Snell L; ICBME Collaborators. Changing the culture of medical training: An important step toward the implementation of competency-based medical education. *Med Teach.* 2017;39:599–602.
- Kezar A, Eckel P. Examining the institutional transformation process: The importance of sensemaking, interrelated strategies, and balance. *Res High Educ.* 2002;43:295–328.
- Griffiths J, Dalgarno N, Schultz K, Han H, Van Melle E. Competency-based medical education implementation: Are we transforming the culture of assessment? *Med Teach.* 2019;41:811–818.
- Beaudan E. Making change last: How to get beyond change fatigue. *Strategic Direction.* 2006;22. <https://doi.org/10.1108/sd.2006.05622gad.010>. Accessed September 30, 2019.
- Gold M, Helms D, Guterma S. Identifying, monitoring, and assessing promising innovations: Using evaluation to support rapid-cycle change. *The Commonwealth Fund.* 2011. <https://www.commonwealthfund.org/publications/issue-briefs/2011/jun/identifying-monitoring-and-assessing-promising-innovations-using>. Accessed September 30, 2019.
- Royal College of Physicians and Surgeons of Canada. Competence By Design. 2018. <http://www.royalcollege.ca/rcsite/cbd/competence-by-design-cbd-e>. Accessed September 30, 2019.
- Dagnone D, Stockley D, Truelove AH, et al. Building capacity for CBME implementation at Queen's University. *MedEdPublish.* 2017;6. <https://doi.org/10.15694/mep.2017.000015>. Accessed September 30, 2019.
- Mertens DM. *Transformative Research and Evaluation.* New York, NY: Guilford Press; 2008.
- Hargreaves MB. Rapid evaluation approaches for complex initiatives. *Mathematica Policy Research.* 2014. <https://aspe.hhs.gov/report/rapid-evaluation-approaches-complex-initiatives>. Accessed September 30, 2019.
- Century J, Rudnick M, Freeman C. A framework for measuring fidelity of implementation: A foundation for shared language and accumulation of knowledge. *Am J Eval.* 2010;31:199–218.
- Mowbray CT, Holter MC, Teague GB, Bybee D. Fidelity criteria: Development, measurement, and validation. *Am J Eval.* 2003;24:315–340.
- Yin RK. *Case Study Research: Design and Methods.* Thousand Oaks, CA: SAGE Publications; 2002.
- Van Melle E. Competency-based medical education: How do we know it works? Plenary Presentation, presented at World Summit on Competency-Based Medical

- Education (CBME) 2018; August 24, 2018; Basel, Switzerland.
- 19 King JA, Morris LL, Fitz-Gibbon, CT, et al. *How to Assess Program Implementation*. Newbury Park, CA: SAGE Publications; 1987.
 - 20 Van Melle E, Frank JR, Holmboe ES, Dagnone D, Stockley D, Sherbino J; International Competency-Based Medical Education Collaborators. A core components framework for evaluating implementation of competency-based medical education programs. *Acad Med*. 2019;94:1002–1009.
 - 21 Saunders B, Sim J, Kingstone T, et al. Saturation in qualitative research: Exploring its conceptualization and operationalization. *Qual Quant*. 2018;52:1893–1907.
 - 22 Norman D. *The Research Act: A Theoretical Introduction to Sociological Methods*. New York, NY: McGraw Hill Book Company; 1978.
 - 23 Frank JR, Snell LS, Sherbino J. *CanMEDS 2015 Physician Competency Framework*. Ottawa, ON, Canada: Royal College of Physicians and Surgeons of Canada; 2015.
 - 24 Royal College of Physicians and Surgeons of Canada. *Entrustable Professional Activities for Emergency Medicine*. Ottawa, ON, Canada: Royal College of Physicians and Surgeons of Canada; 2018.
 - 25 Royal College of Physicians and Surgeons of Canada. *Emergency Medicine Training Experiences*. Ottawa, ON, Canada: Royal College of Physicians and Surgeons of Canada; 2018.
 - 26 Beeson MS, Carter WA, Christopher TA, et al. Emergency medicine milestones. *J Grad Med Educ*. 2013;5(1 Suppl 1):5–13.
 - 27 ten Cate O, Hart D, Ankel F, et al; International Competency-Based Medical Education Collaborators. Entrustment decision making in clinical training. *Acad Med*. 2016;91:191–198.
 - 28 Gofton WT, Dudek NL, Wood TJ, Balaa F, Hamstra SJ. The Ottawa Surgical Competency Operating Room Evaluation (O-SCORE): A tool to assess surgical competence. *Acad Med*. 2012;87:1401–1407.
 - 29 Challis M. AMEE medical education guide no. 19: Personal learning plans. *Med Teach*. 2009;22:225–236.
 - 30 Royal College of Physicians and Surgeons of Canada. *Competence Committee Guideline: Process and Procedures in Decision Making*. June 2017. <http://www.royalcollege.ca/rcsite/cbd/assessment/committees/managing-competence-committees-e>. Accessed September 30, 2019.
 - 31 Andolsek K, Padmore J, Hauer KE, Edgar L, Holmboe E. *Clinical Competency Committees: A Guidebook for Programs*. Chicago, IL: Accreditation Council for Graduate Medical Education; 2017.
 - 32 Schuwirth LW, van der Vleuten CP. Programmatic assessment and Kane's validity perspective. *Med Educ*. 2012;46:38–48.
 - 33 Harris P, Bhanji F, Topps M, et al; ICBME Collaborators. Evolving concepts of assessment in a competency-based world. *Med Teach*. 2017;39:603–608.
 - 34 Lockyer J, Carraccio C, Chan MK, et al; ICBME Collaborators. Core principles of assessment in competency-based medical education. *Med Teach*. 2017;39:609–616.
 - 35 Reddy ST, Zegarek MH, Fromme HB, Ryan MS, Schumann SA, Harris IB. Barriers and facilitators to effective feedback: A qualitative analysis of data from multispecialty resident focus groups. *J Grad Med Educ*. 2015;7:214–219.
 - 36 Bing-You RG, Trowbridge RL. Why medical educators may be failing at feedback. *JAMA*. 2009;302:1330–1331.
 - 37 Griner PF, Danoff D. Sustaining change in medical education. *JAMA*. 2000;283:2429–2431.
 - 38 Boyd VA, Whitehead CR, Thille P, Ginsburg S, Brydges R, Kuper A. Competency-based medical education: The discourse of infallibility. *Med Educ*. 2018;52:45–57.
 - 39 Purdy E. The ritual. In: Sherbino J, ed. *International Clinician Educators Blog*. 2018. <https://icenetblog.royalcollege.ca/2018/07/10/the-ritual>. Accessed September 30, 2019.
 - 40 Schultz K, Griffiths J. Implementing competency-based medical education in a postgraduate family medicine residency training program: A stepwise approach, facilitating factors, and processes or steps that would have been helpful. *Acad Med*. 2016;91:685–689.
 - 41 Gruppen LD, ten Cate O, Lingard LA, Teunissen PW, Kogan JR. Enhanced requirements for assessment in a competency-based, time-variable medical education system. *Acad Med*. 2018;93(3 suppl):S17–S21.
 - 42 Holmboe ES, Ward DS, Reznick RK, et al. Faculty development in assessment: The missing link in competency-based medical education. *Acad Med*. 2011;86:460–467.
 - 43 Shulha LM, Whitmore E, Cousins JB, Gilbert N, al Hudib H. Introducing evidence-based principles to guide collaborative approaches to evaluation: Results of an empirical process. *Am J Eval*. 2016;37:193–215.