Best Practices in Evaluation and Assessment (BPEA)

Changing Curricula to CBME – Issues and Implications

Lesley Wiesenfeld MD, MHCM, FRCPC
Associate Professor & Associate Residency Program Director, Department of Psychiatry, Faculty of Medicine, University of Toronto
Deputy Psychiatrist in Chief, Sinai Health System

Heather McDonald-Blumer MD, MScCH, FRCPC
Associate Professor, Department of Medicine, Faculty of Medicine, University of Toronto
Division Director, Rheumatology, Department of Medicine, Faculty of Medicine, University of Toronto
Associate Director, Osteoporosis program at UHN

Susan Glover Takahashi MA(Ed), PhD
Director, Education, Integration & Research
Associate Professor, Department of Family and Community Medicine, Faculty of Medicine, University of Toronto
Integrated Senior Scholar – Centre for Faculty Development & Post MD Education , University of Toronto

UT CBME / CBD

Best Practices in Evaluation and Assessment (BPEA)
Changing Curricula to CBME – Issues and Implications

Lesley Wiesenfeld, Heather McDonald-Blumer, Susan Glover Takahashi

1. Executive Summary

This paper addresses change management principles, curriculum change and, more specifically, change to curricula related to Competency-Based Medical Education (CBME). . The paper will focus mainly on the issues and implications of curricular changes to the specialty residency educational programs, the university/faculty of medicine systems and processes, and the health facilities where increases in resident teaching and assessment will occur.

The authors independently undertook a focused review of and reported on one of the key topical areas:

- general theories, models, and literature about change,
- change in education broadly, and
- curricular change in medical education.

A summary of key implementations is outlined, including practical solutions.

Curricular change means changes made to educational programs. Curricular change is most successful when there is a clear and accurate picture of the local curricular problem that an individual or group is trying to solve,[1] as well as a clear and accurate picture of the elements of the local curriculum (i.e. learners, teachers, content, and context). Successful curricular changes in medical education have been found to be associated with these features [2]: leadership support, adequate human resources, management of politics, evaluation of process and outcomes, nurturing a cooperative climate, and broad-based participation by organization members.

"Change management" is typically defined as a set of tools, structures, and processes that enable change, and ideally prevent it from causing negative consequences or provoking resistance or distraction.[3,4] The transitional requirements of implementing CBME will require utilization of these tools and processes to enable successful and sustainable change. Arguably, the scope and depth of change required will require not only change management skills, but also change leadership skills.[5] Mastery and application of change leadership frameworks is particularly valuable when the breadth, innovation, urgency, and resource-intensity of a project's goals are both substantial and dynamic.

Postgraduate residency education programs in Canada are undertaking unprecedented changes in their approach to training and assessment paradigms. There are three educational standards that are changing concurrently in specialty education for postgraduate medical education in Canada:

1. Competency framework updating (i.e. CanMEDS 2015), including a developmental continuum and milestones.[6]
2. A CBME model. The specific model used by the Royal College of Physicians and Surgeons (Royal College) is Competence by Design (CBD).
3. Reform of the accreditation standards for university educational systems (A standards), the residency educational systems (B standards),[7] and health facilities systems for residency education (C standards).

Central to the success of implementing CBD will be recognizing the need to pay attention to the theory and practice of change management, curricular innovation, and lessons learned from those who have implemented similar programs to CBD. Additionally, there is a benefit to be gained from regular monitoring and reporting (semi-annually or annually) about the successes and lessons learned, as CBD is gradually implemented.

As medical education in many jurisdictions moves toward CBME or Competence by Design (CBD), early adopters have been able to provide preliminary observations regarding factors that have facilitated, and perhaps challenged, the implementation of CBME within their own institutions.

In the three frameworks that looked at CBME issues, problems, and concerns, it was clear that all attempts at planning and implementation to date have resulted in discussions regarding how to improve the process going forward. The lessons learned can be grouped into important challenges that require management for successful implementation, including: ensuring faculty buy-in[8]; defining and disseminating "how competencies are defined, developed, implemented and assessed"[5,9]; embedding a flexible learning plan [or multiple plans] effectively into a busy clinical environment[5]; accessing/leveraging financial support; implementing assessment methodologies and the requisite documentation to reflect competence-based rather than knowledge-based benchmarks; and encouraging and supporting faculty development to embrace the focus of resident-centred, task-oriented, education and assessment.

2. Background and Methodology

This paper addresses change management principles curriculum change, and change in general, relating to CBME.

Postgraduate residency education programs in Canada are undertaking unprecedented changes in their approach to training and assessment paradigms. The magnitude of these expected changes will require understanding and mastery of relevant change literature to achieve optimal outcomes.

Definitions for key terms used in this paper are found in Appendix 1.

First, this paper explores intersecting information gathered and studied concerning the following topics:

1. *Key changes* occurring in postgraduate medical education in Canada

2. ***Examples of CBME changes in two local residency programs*** that have undergone similar changes in postgraduate medical education
3. Key observations, lessons, and suggestions from the ***change literature***
4. Key observations and suggestions regarding educational reform from the ***curriculum change literature***
5. ***Trends and lessons from early adopters*** in CBME reform.

After looking at these overlapping topics, the paper then examines the issues and implications arising from this focused look at the change and curriculum change literature, and best practices, which serve to inform the structures, processes, and practices of postgraduate medical education.

This paper will primarily focus on the issues and implications of changes to the specialty residency educational programs, the university/faculty of medicine systems and processes, and the health facilities where increases in resident teaching and assessment will occur.

The authors independently undertook a focused review of one of the key topical areas:

- general theories, models, and literature about change,
- change in education broadly, and
- curricular change in medical education.

In addition to examining the topical area, the authors summarized the implications of the changes to competency-based postgraduate medical education.

After reviewing the literature separately, the authors pooled their readings and findings to identify both key themes and gaps in existing scholarship.

3. A Focused Look at Change and Curriculum Change

3.1.   Key changes occurring in postgraduate medical education in Canada

There are three educational standards that are changing concurrently in specialty education for postgraduate medical education in Canada:

1. Competency framework updating (CanMEDS 2015), including a developmental continuum and milestones.[6]
2. The specific CBME model being developed by the Royal College of Physicians and Surgeons (Royal College) is known as Competence by Design (CBD).
   Mandates related to the Royal College vision for CBD:

   - revisions to specialty documents undertaken in a series of 7 cohorts over a decade, starting in 2015,
   - revisions in clinical curricula to align patient exposure to required competencies and discipline-specific Entrustable Professional Activities (EPAs),
   - inclusion of common EPA assessments,

- implementation of comprehensive programs of assessments,
- promotion based on observed, successful completion of clearly defined professional skills, activities, and behaviours, as relevant to the specialty and stage of training, and
- standardized detailed reporting between programs, universities, and the Royal College's progress of residents.[10]

3. Reform of the accreditation standards for university educational systems (A standards), the residency educational systems (B standards),[7] and health facility systems for residency education (C standards).

While the above CBD changes are being implemented, there will be additional concurrent changes, including changes in learners (e.g. numbers, skills, demographics), in teachers (e.g., numbers, skills, needs, funding), and/or to clinical context (e.g., patient needs, health system needs, health system changes).

The implementation of the new educational standards must be viewed within the context of the broader health care system, as changes in residency training requirements will have a substantial impact on the numbers, skills, and potential funding of teachers, and will likely have an impact on how hospitals provide patient care.

As the key changes to residency educational standards and education delivery are considerable, they will significantly impact learners, patients, faculty, and clinical settings.

3.2. Examples of CBME changes to two local residency programs

3.2.1. Orthopedic Surgery Residency Program

Since 2008, the Orthopaedic Surgery program at the University of Toronto has pioneered a competency-based curriculum (CBC). This pilot was done with the approval of the Royal College, the support of government funding, and assistance of the PGME office. The process was led by Drs. Bill Kraemer, Peter Ferguson, and Markku Nousiainen, who are award-winning educators, and now recognized internationally as experts in CBME design and the transformation of traditional residency programs into the CBME model.

The CBC program was designed as a series of 20 modules, each of which focused on a clearly defined core of knowledge and skills. Modules could be completed in variable sequence. Residents would move from one module to the next after being observed to have successfully completed the pre-specified competencies. Initially, three residents were chosen to start their orthopedic surgery training in the CBC program, alongside a larger cohort of residents in the usual program. Each year, another cohort of three residents started the CBC program, until July 2014, when all five PGY 1 residents entered the competency-based program. As of July 2015, the CBC program is the only option for residents entering the orthopaedic surgery training program. Thus far, nine residents have graduated after having gone through the competency-based program: seven residents have completed CBC after 4 years, and two after 5 years.

Building on "lessons learned" since 2008, the CBC is now a "next generation" CBME system with clear, practice-based, performance activities that are linked to a variety of specific

assessment tools. As the pre-CBC system was transformed from the traditional time-based, multi-rotation residency program into the modular format, it was able to ensure a continued focus on technical and procedural competence, and was able to broaden its scope. There was keen attention directed towards making sure that learners were mature professionals with consolidated and broad consultancy skills.

An important early adjustment in the pilot was the move from a "pure" competency-based system (i.e. when a specific competency/module was completed, the resident promptly moved to the next module) to a "matrix" competency-based system (i.e. modules are planned for a fixed/usual period of time and most residents complete the specific competency/module in that fixed/usual rotation period). The implications of a pure competency-based system quickly became untenable. The lack of predictability in resident schedules had negative effects on patients, health systems, other team members, and administrative workload; learners, patients, and care-providers benefit from the predictable transitions that a matrix system offers; furthermore, it is more aligned with the "real-world practice" for which residents are being prepared. In the matrix system, at the end of the fixed/usual rotation period, if the resident has not yet successfully demonstrated the specific competency, then another learning opportunity is planned at a feasible point in the months that follow.

In the past year, there has been further significant refinement of curriculum maps, assessment plans, and tools, including the implementation of online assessments and tracking systems. At the present time, all of the PGY 1-5 (total of 34) residents are in the CBC stream.

The CBC implementation highlights many lessons about curricular change, including the need for detailed planning, leadership, flexibility during implementation, and evolution and improvements through pilot evaluation.

3.2.2. Family Medicine Residency Program

In 2011, the College of Family Physicians of Canada (CFPC) revised their residency education to what they have termed a "*Triple C Competency-Based*" curriculum:[11]

- ✓ Comprehensive care and education
- ✓ Continuity of care and education
- ✓ Centred in Family Medicine

Since 2011, the 15 Family Medicine sites at the University of Toronto, with the assistance of the Department of Family and Community Medicine (DFCM)'s central team and the leadership of the Program Director (Dr. Karl Iglar), have been implementing and iteratively revising a comprehensive feedback and formative assessment online tool called "Field Notes." The notes are recorded regarding a given/specific patient encounter and are one of Family Medicine's current competency-aligned training innovation interventions.

As a collection, the field notes provide a personalized picture of the learners' practice and progress. Case mix and procedures are tracked to make sure that gaps are noted and then filled, that skills needing polishing are developed, and that expertise is developed and monitored. Additionally, all residents now complete a written progress test every six months.

This test uses key features cases to inventory knowledge, knowledge application, and decision-making. This further facilitates progress tracking and feedback on learner progress.

The Family Medicine program has a well-developed system to identify residents who are struggling, and to provide supports at the program level or under the Board of Examiners' system.

3.3. Key observations, lessons, and suggestions from the change literature

Change management is typically defined as a set of tools, structures, and processes that enable change and, ideally, prevent it from causing negative consequences or provoking resistance or distraction.[5,9] The transitional requirements of implementing CBME will require utilization of these tools and processes to enable successful and sustainable change. Arguably, the scope and depth of change required will necessitate not only change management skills, but also change leadership skills.[5]

Change leadership is critical when the breadth, innovation, urgency. and resource-intensity of a project's goals are both substantial and dynamic. Competence by Design (CBD), the Royal College's approach to CBME, will require demonstrating a competency focus in training and assessment; however, design and implementation will be iterative and shaped by a variety of internal and external factors.

Change leadership will be needed to ensure engagement and oversight. Though the novelty of CBD brings some uncertainty with it, what is certain is that change is required, and thus, complementary mastery of change management competency will arguably be as necessary as mastery of the CBME itself.

In "Leading Change – Why Transformation Efforts Fail", Kotter[5] highlights the following eight steps as key to improving the likelihood that change efforts will succeed:

1) Establish a sense of urgency.
2) Form a powerful guiding coalition.
3) Create a vision.
4) Communicate the vision.
5) Empower others to act on the vision.
6) Plan for and create short-term wins.
7) Consolidate improvements and produce more change.
8) Institutionalize new approaches.

One of the potential challenges to address in CBME implementation is the degree to which the driver for change emerges from the new Royal College CBD framework[6] as opposed to a more internally/organically driven sense of urgency for Program Directors or faculty.

The change leadership task then is to acknowledge the multifactorial etiology of the urgency, align it with the values inherent in the new approach, and authentically move through steps 2 to 8, paying particular attention to addressing the motivational, cognitive, political, and resource hurdles that exist as barriers to change.[12]

In "Switch – How to Change Things when Change is Hard,"[9] the authors present a three-part model for change management that stresses the importance of:

1) addressing the *rational* aspects of stakeholders,
2) addressing the *emotional* aspects of stakeholders, and
3) **shaping** the most effective *path* towards sustained, effective change.

Resistance amongst the **rational stakeholders** is often related to lack of clarity in the change process; thus **engagement along rational dimensions** requires steps that align accordingly, such as:

- clear mapping of steps,
- utilizing existing approaches that are already achieving elements of the goal ("the bright spots"), and
- articulating not only the goals but also the actions/behaviours that will confirm the goal has been achieved.

These critical components help achieve alignment with participants' rational sides. As the authors suggest: "*Make a script. Clarity resolves resistance. Change is easier when you know where you're going and why*."

Motivating the **emotionally** driven stakeholders requires a complementary focus that depends more on:

- helping faculty to "feel" the need for change, and/or
- anticipating what might "feel better" in the new normal.

This may involve student, patient, or faculty narratives that highlight what might "feel better" about teaching, learning, or being cared for in a CBME/CBD environment. We know that students often give feedback about the value of being observed and having opportunities for more precise feedback, so this is a natural "win" in the CBD-aligned change.

Shaping the most effective path can be nicely and effectively achieved with the notion of "the quick win," or what the authors of *Switch* call, "*shrinking the change.*" On a change journey, whether it is CBME implementation or weight loss or anything else challenging, most people require the encouragement, relief, and satisfaction that comes from iterative achievements to emotionally nourish further effort. Celebrating these "quick-win" achievements should also be built into the change process.

3.4. Key observations, lessons, and suggestions from the curricular change literature

Curricular change means changes made to educational programs. In CBD, curricular changes to PGME programs include what is in them and how they are organized and delivered for residents, such as:

- learning/teaching content (e.g. Required Training Experiences, CanMEDS 2015),
- assessment content (e.g. EPAs), and

- assessment processes (e.g. four stages of residency, Competence Committee reviewing progress).

Curricular change[1] is most successful when:

1. There is a clear and accurate picture of the local curricular problem that an individual or group is trying to solve.
2. There is a clear and accurate picture of the elements, or Schwab's commonplaces, of the local curriculum, namely:
    a. Learners: "real time" understanding of local learners, including number, features, strengths, and limitations.
    b. Teachers: "real time" understanding of local teachers, including number, types, features, strengths, and limitations.
    c. Content: including competencies to be learned, taught, and assessed. Includes systems and processes, as well as tools for learning, teaching, and assessment.
    d. Context: understanding of the formal, informal, and clinical settings and cultures where the curriculum occurs.

In 2000, Bland et al.[2] systematically reviewed literature on what was important to "successful curricular changes" and found there were six features of varying importance to the implementation. These features are highlighted in Table 1 and Figure 1.

Table 1 Important Features of Successful Curricular Changes

#	Feature	Number of Successful Curricular Changes
1	Leadership	55
2	Human Resources	48
3	Politics	36
4	Evaluation	30
	Cooperative Climate	30
6	Participation by Organization Members	27

Figure 1 Important Features of Successful Curricular Changes

Participation by organization members (27)
Politics (36)   Evaluation (30)
Leadership (55)
Cooperative climate (30)   Human resources (48)

Bland also notes that one of the characteristics of successful innovation – curricular or otherwise – is that the innovation and strategies used to implement a successful curricular innovation must be appropriate to the context of the organization and its environment.

For this reason, most studies of organizational change, whether in corporate or educational settings, do not claim that their results are necessarily transferable to other organizations. Still, Bland notes the remarkable consistency across disciplines and settings with regard to the characteristics associated with successful change efforts.

3.5 Trends and lessons from early adopters in CBME reform.

As medical education in many jurisdictions moves toward CBME, or Competence by Design (CBD), early adopters have been able to provide preliminary observations regarding factors that have facilitated, and perhaps challenged, the implementation of CBME within their own institutions.

Looking broadly across the CBME literature, a recent review by Norman, Norcini, and Bordage[3] divides the potential barriers into:

- conceptual problems
- psychometric issues
- logistical challenges

Similarly, Hawkins[13] has reviewed recent literature and categorized the challenges as being:

- operational: those related to the practical, administrative, and logistical issues of implementing a competency-based education framework, or
- theoretical/conceptual: those related to incomplete understanding or lack of support for the pedagogical underpinnings for the curricular changes

Glover Takahashi et al.[4] performed focused, semi-structured interviews of education leaders who had experience in designing, implementing, or managing a CBME program. Their analysis revealed that common key features of challenge or concern revolved around:

- *time* (to develop and implement)
- *assessment* (who, when, and how)
- *support* (faculty, staff, and residents)
- *interest* (residents and faculty)
- *funding* (for the development and implementation, the infrastructure, and curriculum expansion)

Whichever study or framework is used, some challenges or concerns will fit into more than one category[5,9] and all attempts at planning and implementation to date have resulted in discussions regarding how to improve the process going forward.

In reviewing programs that have begun implementing CBME, the following six potential challenges have been identified as requiring management for successful implementation:

1. **Securing faculty buy-in:[8]**

Issues related to faculty buy-in include:

- Faculty argue that much of the current system functions very well, so why change it.
- The value of the planned changes is not broadly appreciated or agreed to by front-line faculty.
- Concerns that competence is a minimalist approach versus the alternative view of aiming for excellence.
- Concerns that the time to complete required the assessments will be onerous.

2. **Defining and disseminating "how competencies are defined, developed, implemented, and assessed":[5,9]**

- The language of CBME is new to most physicians, and the definitions are not consistent across various jurisdictions, potentially resulting in confusion amongst educators and teachers, which could translate into less successful adoption of the CBME framework.

3. **Embedding a flexible learning plan (or multiple plans) effectively into a busy clinical environment:[5]**

- Implementing individualized training pathways (which adapt to those who excel and could complete training early as well as those who require additional time to attain the required skills set) could pose challenges with regard to coordinating clinical rotations, meeting service obligations for hospitals, planning transition to next levels of training or practice licensure, and determining the required funding.

4. **Accessing/leveraging financial support:**

- Competency-based education is expensive to initiate and sustain. Direct costs include those related to the development and initial implementation of the curriculum, the related assessment frameworks, and the IT platforms to support both initiation and maintenance of the programs. Simulation costs for teaching and for assessment have been noted to increase five- to six-fold in some programs. The requirements for program administrative support have nearly doubled. Indirect costs borne by the programs, universities, and hospitals must be considered. For example, more flexibility in the learner schedule and more time for faculty participation in assessment could result in the need to have more faculty and non-physician health care providers on staff to maintain clinical care.

5. **Implementing assessment methodologies and the requisite documentation to reflect competence-based rather than knowledge-based benchmarks:**

- The need for greater direct observation of learners in the workplace permeates the CBME/CBD literature. New, valid assessment tools may need to be developed. There are logistical, time-based, and administrative complexities involved in implementing learner-centric assessments, particularly in large programs.

6. **Encouraging and supporting faculty development to embrace the focus of resident-centred, task-oriented education and assessment:**

- There is a need to understand individual and group needs for both small and large solutions to support faculty, and then to develop, deploy, and evaluate those solutions.
- While the current literature tends to focus on the challenges, being aware of the experience of others provides a clear focus on key issues that need to be considered and addressed when planning the transition from traditional to CBME curricula.

4. Discussion and Summary

4.1 Discussion

Change is difficult and complicated, and the effort needed to change complex systems is often underestimated. The enthusiasm of the change leaders for the new improved way often distracts them from the need to purposefully consider that the "improvement" is a change. Those who do not immediately support the "improvement" are often viewed negatively as resisters or outliers. Furthermore, a breadth of literature in a variety of domains (education, business, healthcare) highlights the importance and challenge of sustaining change, recognizing that organizations can fatigue and burn out under the pressures of adopting novel ways of working, particularly when the gains of the change may be appreciated more in the long term than in the short term, as will likely be the case in the transition to Competence by Design.

It is also important to note that the CBD change is happening concurrently with increased pressures on health-care organizations/providers to be accountable for clinical/operational metrics, and this puts successful implementation of CBD at risk.

The mandated changes in CBME, in the form of CBD, have both the advantage and limitation of being organized through the sponsoring organization (the Royal College), which is a well-established organization and has authority over the accreditation of educational programs and certification of individuals. Authority and power sometimes function to motivate changes, but at other times, authority and power combine to prevent changes.

Residency education is a complicated enterprise at each of the 17 universities. For example, at the University of Toronto there are over 70 different residency programs that will undergo different changes in 7 cohorts over a 10-year period. There are over 3000 residents in those 70-plus programs. University of Toronto has over 10,000 physicians, as well as thousands of other health team members (e.g. nurses, pharmacists, technologists), who provide teaching and assessment for those 3000 residents at the approximately 30 affiliated health facilities. With all these people, structures, organizations, and systems to manage, implementing CBD will need a sustained, comprehensive multipronged approach.

As programs work to address the challenges of defining and then implementing competency-based medical education within their own discipline, guidance and structure can be obtained from a variety of sources. The Royal College, in its key role of accrediting programs and mandating the transition of residency training programs to a competency-based structure, has made available educational and planning resources. Individual programs can then work with their national colleagues through the Royal College Specialty Committees, in addition to sharing resources and expertise across their local postgraduate medical education network.

4.2 Implications

Below are the key implications arising from our study of change and CBME.

Table 2 Key implications about Change for Successful CBD Curricular Integration

#	Implication	Which individuals or groups need to know or act on this implication	Suggestions or solutions
1	Successful initiation, spreading, and sustainability of large-scale changes, such as Competence by Design (CBD), to an organization/enterprise, requires a combination of leadership, communication, and coalition-building to create alignment around the goal/future state as being superior to the current state, and enough enablers to help operationally navigate the transition to the "new normal."	Residents, faculty, hospital leadership, and patients all need to have explicit opportunities for input to changes, identify the required enablers and clarify variations from the status quo. The transition to CBD components will require new behaviour and new resources, and will affect how patients, resident learners, and their supervisors interact.	- Highlight the specific local benefits of CBD adoption to learners, faculty, patients, and the health-care system - Develop targeted communication and operational approaches that acknowledge the rationale and emotional resistances to change, and address those resistances authentically - Develop and communicate an iterative, reflective, stakeholder-engagement approach to change that enables continuous improvement and reassures participants that the approach to change is realistic and respectful - Establish targets for change that provide "quick wins" and communication of success
2	Innovation and strategies used to implement successful curricular change must be appropriate to the context of the organization and its environment. As such, having an accurate and realistic picture of the following will be important: - learners - teachers - learning/teaching content - learning and practice context - necessary monitoring, assessments, evaluations	All parts of the PGME enterprise needs to be well understood to ensure successful curricular changes of CBD, including: - residents - program directors - residency program committees - faculty - education leadership at health facilities - faculty development leaders	- Develop an accurate picture of programs, organizations, and systems - Analyze past successful and unsuccessful curricular changes for the program - Inventory which curricular characteristics need support or development - Focus on building solutions that will work locally

#	Implication	Which individuals or groups need to know or act on this implication	Suggestions or solutions
	- available local resources	- central faculty and PGME resources and systems	
3	Successful development and implementation of CBD will depend on: - development of authentic discipline-specific EPAs that faculty believe adequately capture the knowledge and skills required for physicians to provide exemplary patient care - implementation that builds on the excellence of the residency educational program - careful roll-out that doesn't jeopardize patient care or the functioning of health teams - educational support for physicians who will be on the front line in supervising and assessing learners - a valid, practical assessment system - the infrastructure to support the development, implementation, and maintenance of the new system	The groups that need to be part of the discussions include: - residents, - program directors, - competence committees - PGME Dean and PGME office leadership - hospital leaders - departmental leadership - specialty committees of the Royal College, including the program directors within the discipline - national specialty societies	- Define the key elements of the clinical discipline (the EPAs, competencies, and milestones) by consensus, thus ensuring that they accurately reflect desired outcomes of physician performance and patient care - Work collaboratively within the discipline and across the postgraduate departments to develop valid, practical assessment tools - Consider economies of scale and sharing of best practices to help mitigate the high costs of CBD development and implementation - Provide ongoing faculty development

4.3 In Summary

Central to the success of implementing CBD will be recognizing the need to pay attention to the theory and practice of change management, curricular innovation, and lessons learned from those who have implemented programs similar to CBD.

Additionally there is benefit to regular monitoring and reporting (e.g. semi-annually or annually) about the successes and lessons learned as CBD is gradually implemented.

6. References

1. Fox S. The vitality of theory in Schwab's conception of the practical. Curriculum Inquiry. 1985;15(1):63.
2. Bland CJ. Curricular change in medical schools: how to succeed. Academic Medicine. 2000;75(6):575-594.
3. Norman G, Norcini J, Bordage G. Competency-based education: milestones or millstones? J Grad Med Educ. 2014;6(1):1-6.
4. Glover Takahashi S, Waddell A, Kennedy M, Hodges B. Innovations, Integration and Implementation Issues in Competency-Based Training in Postgraduate Medical Education. 2011.
5. Kotter J. Leading Change. Boston: Harvard Business School Press; 1996.
6. Frank JR, Snell L, Sherbino J, editors. The CanMEDS 2015 Physician Competency Framework. Ottawa: The Royal College of Physicians and Surgeons of Canada; 2015.
7. Competence by Design and accreditation. http://www.royalcollege.ca/rcsite/cbd/cbd-accreditation-e. Accessed 2016 October 10.
8. Holmboe ES, Ward DS, Reznick RK, et al. Faculty development in assessment: the missing link in competency-based medical education. Acad Med. 2011;86(4):460-467.
9. Heath C, Heath D. Switch: How to change things when change is hard. Toronto, Canada: Random House Canada; 2010.
10. The Meantime Guide. www.royalcollege.ca/meantime-guide. Accessed 2016 October 10.
11. Delva D, Sargeant J, Miller S, et al. Encouraging residents to seek feedback. Medical Teacher. 2013;35(12):e1625-e1631.
12. Kim WC, Mauborgne R. Tipping point leadership. Harv Bus Rev. 2003;81(4):60-69.
13. Hawkins RE, Welcher CM, Holmboe ES, et al. Implementation of competency-based medical education: are we addressing the concerns and challenges? Med Educ. 2015;49(11):1086-1102.

7. Appendix 1: Key Terms

COMPETENCE BY DESIGN (CBD) TERMINOLOGY

FRAMING CONCEPTS

CBME, CBD, TRIPLE C: Differences and Similarities

We've noticed that with increasing frequency Program Directors are trying to sort out the differences between CBME and CBD and what the impact is for them, their residents, their program, and their faculty.

Competency-Based Medical Education (CBME)[1] is an outcomes-based approach to the design, implementation, assessment, and evaluation of an educational program using an organized framework of competencies (e.g. CanMEDS 2015).

Competence by Design (CBD) is the Royal College's "brand" of CBME and is their transformational initiative designed to enhance competency-based medical education (CBME) in residency training and specialty practice in Canada.

In 2011, the College of Family Physicians of Canada revised their residency education to a **Triple C Competency-Based** curriculum[2]:
- **Comprehensive** care and education
- **Continuity** of care and education
- **Centred** in Family Medicine

The **Competence Continuum** reflects the developmental stages of professional practice (See Figure 1 below). In each stage there will be specific milestones that a resident will be expected to demonstrate. The duration (e.g. weeks, blocks, months) for each stage is being determined by each specialty as part of their cohort plans for implementation of CBD.
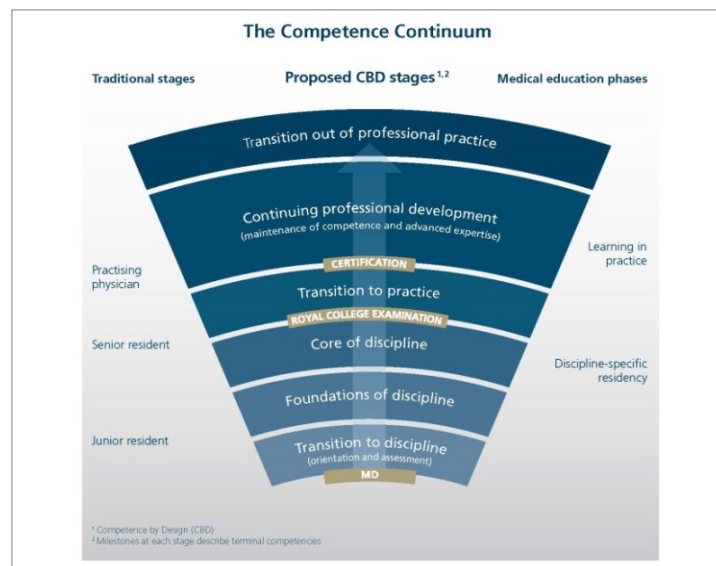
The first stage for residents is
- Transition to Discipline that will include an orientation to and demonstration of readiness for the autonomy of residency education.
- Foundations, the second stage of the continuum of residency education, is when the basics, including the most common and frequent patient problems of the specialty, are taught, learned, assessed, and demonstrated.
- Core is the third stage of the continuum of residency education where the patient problems are increasingly complex and complicated and where the less common patient problems are managed. It is anticipated that in the future the specialty exam will be administered near the end of the Core stage.
- The fourth and final stage of residency education is Transition to Practice, which focuses on ensuring residents' confidence and competence to practice within their discipline.

Entrustable Professional Activities (EPAs) are an approach to competency-based medical education (CBME) that focuses on "real" clinical activities that are carried out in day-to-day practice.[3] Learners, teachers, and assessors will focus on concrete critical clinical activities that provide insight to the residents' development, progress, and proficiency.

The notion of "trust" is not new to residency education as, each day, faculty members decide which patients or patient problems they will assign to which residents. What EPAs aim to do is to provide some consistency in when, how, and where specific activities of a discipline are taught, learned, and assessed.

For example, in the Orthopaedic Surgery competency-based program, the 5-year training program has about 20 modules completed over 3 phases (i.e. basic, advanced, complex). To be successful in each module, learners must demonstrate that they have the required knowledge (e.g. via written test), skills, and abilities (e.g. via observed history/physical and the observed completion of a surgical procedure). In the Orthopaedic Surgery program, their "index" cases or EPAs are those that reflect increasing mastery of their discipline.

RC-Entrustable Professional Activities (EPA) is the Royal College approach to EPAs. For the implementation of CBD, each specialty program will develop a list of important activities that residents need to learn and perform. Example RC-EPAs are: "run a code", "do procedure X", "lead a meeting with a patient and their family disclosing serious news". As well, each discipline is working to identify specific RC-EPAs that teachers/faculty will "sign-off on" after direct observation, thereby entrusting that the residents will be able to perform the activity independently

Milestones
As part of the renewal of CanMEDS 2015, generic milestones were identified. As each program moves through CBD, they use those generic milestones to inform the design of specialty-specific milestones.

Milestones:
- Illustrate the developmental nature, features, and progression of the competencies
- Assist learners in monitoring their own developmental progress
- Are used as a reference to monitor individual learner progress
- Guide development of the teaching program

- Assist in the early identification of learners whose progress is not following the typical development sequence and initiate early intervention

The CanMEDS 2015 Milestones Guide[4] is a companion document to the CanMEDS 2015 Framework, and describes the competencies expected along the continuum of practice.

Required Training Experiences (RTE) is a new Royal College document being developed for each of the programs transitioning into Competence By Design. This document includes the eligibility requirements for the discipline, as well as the training experiences required or recommended for each of the four stages of the residency education competence continuum.

Confirmation of competence is the confirmation of resident progress for each stage of the Royal College competence continuum. The Competence Committee is to make decisions as to the progress of resident competence at regularly scheduled meetings through the review of assessments completed during each stage. Confirmation of competence permits residents to move on to the next stage of education.

Promotion is the confirmation of resident advancement from one year to the next (e.g. from PGY1 to PGY2) within a residency training program.

IMPLEMENTATION RESOURCES

A **Curriculum Map** is an educational tool which provides a simplified picture of what and who is involved in learning and teaching in residency education, including:
- who are learners (i.e. competence continuum stage, PGY level)
- who are teachers (i.e. faculty, other team members, co-residents, self-taught)
- what is being taught (e.g. clinical/patient care focus, priority CanMEDS roles for learning/teaching)
- when this is occurring (e.g. blocks or months, competence continuum stage)
- where the education is occurring (e.g. clinical location(s)).

An **Assessment Plan** is an educational tool that provides an overall plan for the assessments in residency education. The plan provides an accurate picture of a resident's progress on the competence continuum, including:
- who are learners (i.e. competence continuum stage, PGY level)
- who are assessors (i.e. faculty, other team members, co-residents, self-taught)
- what is being assessed (e.g. EPAs, competencies, milestones, priority CanMEDS roles)
- when it will be assessed(e.g. blocks or months, competence continuum stage),
- where it will be assessed (e.g. clinical location(s))
- why it is being assessed (e.g. formative assessment, summative assessment)
- how it is being assessed (e.g. encounter forms, multisource feedback, ITERs, written exams, "homework assignments").

A **Rotation Plan** is a focused educational tool that provides the specific information for a given rotation or learning experience, including:
- location(s), timing, and focus of rotation/educational experience
- specific goals and objectives, required training experiences, and Entrustable

professional activities included in the rotation
- learning/teaching activities and planned assessments included.

The University of Toronto's Education Innovations Group is facilitating CBD implementation, including working with programs in the preparation of curriculum maps, assessment plans, and rotation plans.

CanMEDS Tools Guide[5]

The *CanMEDS Teaching and Assessment Tools Guide* (CanMEDS Tools Guide) was developed for busy Program Directors and faculty who are responsible for implementing the CanMEDS physician competency framework in residency programs.

This guide was inspired by a desire to enhance residency education in Canada and support the implementation of the CanMEDS 2015 Framework. It is a resource designed to support learning, teaching, and assessment of the core skills and competencies of the CanMEDS Roles as part of everyday resident work. Included are tips for teaching and assessment, and ready-to-use (or modify) tools.

References

1. Frank, J. R., L. S. Snell, O. Ten Cate, E. S. Holmboe, C. Carraccio, S. R. Swing, P. Harris, N. Glasgow, C. Campbell, D. Dath, R. M. Harden, W. Lobst, D. M. Long, R. Mungroo, D. Richardson, J. Sherbino, I. Silver, S. Taber, M. Talbot and K. A. Harris (2010). "Competency-based medical education: theory to practice." Medical Teacher **32**(8): 638-645.
2. Saucier, D., S. Schipper, I. Oandasan, M. Donoff, K. Iglar and E. Wong. (2011). "Defining the Three Cs of the Triple C Competency-based Curriculum." Retrieved May 23, 2017, from http://www.cfpc.ca/uploadedFiles/Resources/Resource_Items/Triple_C/3%20Defining%20the%20Three%20Cs%20of%20the%20Triple%20C%20Competency-based%20Curriculum.pdf.
3. Ten Cate, O. and F. Scheele (2007). "Competency-Based Postgraduate Training: can we bridge the gap between theory and clinical practice?" Academic Medicine **82**(6): 542-547.
4. Frank, J. R., L. Snell and J. Sherbino, Eds. (2015). The CanMEDS 2015 Physician Competency Framework. Ottawa, ON, The Royal College of Physicians and Surgeons of Canada.
5. Glover Takahashi, S., C. Abbott, A. Oswald and J. R. Frank, Eds. (2015). CanMEDS Teaching and Assessment Tools Guide. Ottawa, ON, Royal College of Physicians and Surgeons of Canada.

8. Appendix 2: Annotated Bibliography

1. **Kotter, J. (1996). <u>Leading Change</u>. Boston, Harvard Business School Press.**

   This book is a classic "how to" resource on managing and leading change. An important resource to guide and inform change management. Also see
   http://www.kotterinternational.com/the-8-step-process-for-leading-change/

2. **Heath, C. and D. Heath (2011). <u>Switch: How to change things when change is hard</u>. Waterville, ME, Thorndike Press.**

   This easy to read is a practice resource that helps the reader understand the challenges of leading change, as well as offering practical and innovative advice on being a successful change leader. Also see *http://heathbrothers.com/books/switch/*

3. **Bland, C. J. (2000). "Curricular change in medical schools: how to succeed." <u>Academic Medicine</u> 75(6): 575-594.**

   This study systematically searched and synthesized the literature on educational curricular change to provide guidance for those who direct curricular change initiatives in medical education.

   The focus was on the process of planning, implementing, and institutionalizing curricular change efforts. The paper identifies and describes the consistent set of characteristics that emerged as being associated with successful curricular change in medical education.

   By understanding these characteristics, those involved in CBME curricular change can ensure that the plan for success but ensuring their approach considers the important characteristics.

Below is a collection of articles that reflect the learnings from implementing CBME in residency education.

- Boet, S., A. Pigford and V. Naik (2016). "Program director and resident perspectives of a competency-based medical education anesthesia residency program in Canada: a needs assessment." <u>Korean Journal of Medical Education</u> **28**(2): 157-168.
- Chacko, T. (2014). "Moving toward competency-based education: Challenges and the way forward." <u>Archives of Medicine and Health Sciences</u> **2**(2): 247.
- Dath, D. and W. Iobst (2010). "The importance of faculty development in the transition to competency-based medical education." <u>Medical Teacher</u> **32**(8): 683-686.
- Levine, M. and G. Shorten (2016). "Competency-based medical education: Its time has arrived." <u>Canadian Journal of Anaesthesiology</u> **63**(7): 802-806.
- Schultz, K. and J. Griffiths (2016). "Implementing Competency-Based Medical Education in a Post-graduate Family Medicine Residency Training Program: A Step-wise approach, Facilitating Factors, and Process or Steps That Would Have Been Helpful." <u>Academic Medicine</u> **91**(5): 685-689.

- Stodel, E., A. Wyland, S. Crooks, S. Moffett, M. Chiu and C. Hudson (2015). "Designing and Implementing a Competency-Based Training Program for Anesthesiology Residents at the University of Ottawa." <u>Anesthesiology Research and Practice</u>: 1-7.
- Weinberger, S., A. Pereira, W. Iobst, A. Mechaber, M. Bronze and Alliance for Academic Internal Medicine Education Redesign (2010). "Task Force II. Competency-Based Education and Training in Internal Medicine." <u>Annals of Internal Medicine</u> **153**(11): 751.