IMPACT OF COMPETENCE BY DESIGN ON THE RESIDENT EXPERIENCE

INTENDED AND UNINTENDED CONSEQUENCES: THE IMPACT OF COMPETENCE BY DESIGN IMPLEMENTATION ON THE EXPERIENCES OF TRAINEES IN A PEDIATRIC RESIDENCY PROGRAM

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A Thesis Submitted to the School of Graduate Studies in Partial Fulfillment of the Requirements for the Degree Master of Science

McMaster University MASTER OF SCIENCE (2024) Hamilton, Ontario
(Health Science Education)

TITLE: Intended and Unintended Consequences: The Impact of Competence by Design Implementation on the Experiences of Trainees in a Pediatric Residency Program

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NUMBER OF PAGES: xi, 66

LAY ABSTRACT

In July 2021, Competence by Design (CBD), a competency-based medical education (CBME) curriculum, was implemented in Canadian pediatric training programs. We wanted to understand how this shift affects residents' experiences compared to the previous curriculum. We included residents in CBME and non-CBME streams, all from the McMaster Pediatric Residency Program, and focused on observation, feedback, assessment, and well-being. Using electronic journals and surveys, we found that CBME residents attempted more assessments and spent more time on them, while both groups received similar observations and feedback. Burnout was prevalent in both groups, but the CBME residents were more likely to endorse assessments as a contributing factor. These findings highlight the need to explore CBME's impact on resident well-being and how residents' educational experiences have changed following CBD implementation.

Abstract

Background: Recent reports from Canadian academic institutions provide insights into the resident experience following Competence by Design (CBD) implementation and have suggested important unintended consequences, such as increased administrative burden. Since pediatric residency programs transitioned in July 2021, half of McMaster University's Pediatric Residency Program residents were in competency-based medical education (CBME) streams in the 2022-2023 academic year, and half were in non-CBME streams. As a result, our objective was to compare the residents' experiences in these two streams for observation, feedback, assessment, and well-being and burnout.

Methods: We studied resident physicians in the McMaster Pediatric Residency Program ($n = 37$ eligible residents), employing a two-phased quantitative sequential exploratory approach. In Phase 1, residents used electronic journals (e-journals) to log feedback, observation, and assessments over two weeks and time spent on clinical assessments. Phase 2 involved an anonymous survey to recall experiences with assessment, supervision, and observation. Validated single-item measures from the Maslach Burnout Inventory assessed emotional exhaustion and depersonalization.

Results: The e-journal response rate was 56.8% (21/37), with complete responses from 10 CBME and 11 non-CBME residents. Our analyses indicated that CBME residents attempted more assessments ($p < .01$) and spent more time on them (126 minutes vs. 28 minutes for non-CBME residents, $p < .01$). Both

groups reported similar rates of observation and feedback. The survey response rate was 59.5% (22/37), with complete responses from 15 CBME and seven non-CBME residents. Burnout was prevalent, with CBME residents more likely to endorse assessments as a cause of feeling burnt out ($p = 0.023$).

Discussion: Given the significantly increased contribution of clinical assessments to burnout in the CBME cohorts, it is crucial to further investigate this curriculum's administrative burden and its implications for resident well-being. Further research is needed to explore the changes to the quality and quantity of feedback, observation, and assessment in CBME.

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LIST OF ABBREVIATIONS AND SYMBOLS

CBD: Competence by Design

CBME: Competency-Based Medical Education

CC: Competence Committee

CCF: Core Components Framework

E-Journal: Electronic Journal

FOI: Fidelity of Implementation

EPA: Entrustable Professional Activity

FMRQ: Fédération des Médecins Résidents du Québec

RCPSC: Royal College of Physicians and Surgeons of Canada

DECLARATION OF ACADEMIC ACHIEVEMENT

Dr. Spencer van Mil primarily performed the work described in this thesis and was supervised by Dr. Anita Acai. Participant requirement was done with permission and assistance from Dr. Mohammad Zubairi and Dr. Elif Bilgic from the Department of Pediatrics at McMaster University. Analysis was completed by Dr. van Mil with the supervision and support of Dr. Acai.

Chapter 1: Introduction

1.1 Implementation of Competency-Based Medical Education (CBME)

Traditional postgraduate medical education models were time-based, emphasizing the completion of a specific amount of supervised study and clinical service for residents to become independent practitioners (Hodges, 2010). However, since these training models were first developed, changes to the medical profession have necessitated curricular reform. These evolving demands of modern clinical medicine included expanding the required knowledge base of physicians, fewer clinical learning opportunities, and challenges balancing clinical service and education (Densen, 2011; Reznick & MacRae, 2006).

Due to these demands, numerous concerns regarding traditional training models have been explored in the literature. An example is the variability in clinical exposure and learning opportunities between trainees (Bismilla et al., 2015; Stahl et al., 2014). Multiple factors can impact the specific training experiences encountered by trainees within their residency program. These factors include the size and location of the training center, as well as the size of the residency program (Bismilla et al., 2015; Daniels et al., 2014; Falcone, 2015; Singh et al., 2014). Within programs, additional factors can impact the educational opportunities available to residents (Bismilla et al., 2015; Daniels et al., 2014; Singh et al., 2014). For example, certain high-acuity neonatal procedures occur infrequently, making clinical opportunities challenging to guarantee for trainees (Bismilla et al., 2015; Gaies et al., 2007; White et al.,

1998). Past research from Bismilla and colleagues (2015) demonstrated that program directors in Canada reported that they felt graduating residents were often not adequately prepared for procedures that were deemed to be essential and identified this as a weakness of training (Bismilla et al., 2015; Gaies et al., 2007; White et al., 1998). Furthermore, Bell and colleagues (2009) identified that there are often not adequate opportunities to learn core procedures within general surgery. These findings and additional data from various specialties have raised concerns about physician preparedness for independent practice, given that training programs might not consistently provide sufficient clinical opportunities to attain all required skills (Bismilla et al., 2015; Daniels et al., 2014; Holmboe, 2021; Stahl et al., 2014). Another concern with the traditional training models was that assessments did not consider the modern view of physician competence, which has moved beyond the traditionally assessed medical knowledge and procedural skills (Frank et al., 2010; Menezes et al., 2018). Within this modern view of broader physician competence, there are challenges in evaluating and tracking competencies in areas such as communication, collaboration, and advocacy (Frank et al., 2010).

Given the evolving demands of the medical profession and the previously noted challenges with traditional training models, there were concerns that time-based models were not sufficient for contemporary residency training (Frank et al., 2010; Gruppen, Mangrulkar, & Kolars, 2012; Reznick & MacRae, 2006). Competency-based models move away from a prespecified training time and

focus on standardized performance outcomes required to be a competent, independent practitioner in a given specialty (Frank et al., 2010). Van Melle and colleagues (2019) described that competency-based elements could bring change through reform and production. Through a reform approach, a constructivist approach is taken. Within constructivism, learning is described as an active process that occurs through interactions within the learner's environment, building on previous experiences and knowledge (MacLeod, Burm, & Mann, 2022). CBME uses the constructivist approach through extensive curricular planning to build educational experiences upon one another (Frank et al., 2010; Sherbino et al., 2021). However, also at the core of this transition is that residents must demonstrate that they have attained the competencies required of their specialty to complete training (Frank et al., 2010; Holmboe, 2010). This concept is in keeping with the previously mentioned production approach mentioned by Van Melle and colleagues (2019) that is rooted in behaviourism. Behaviourism, which is focused on observable behaviours, is also at the core of competency-based models in that medical competencies are divided into discrete tasks to be observed and assessed (Hawkins et al., 2015; Sherbino et al., 2021). In addition, competency-based models aim to provide comprehensive information to aid in entrustment decisions, increase feedback and assessments for trainees to guide learning, and create a performance standard for physicians when starting independent practice (Frank et al., 2010; McGaghie et al., 1978). As mandated by the Royal College of Physicians and Surgeons of Canada

(RCPSC), postgraduate medical education training programs in Canada have been shifting from time-based to competency-based medical education (CBME) since 2017, intending to achieve the above-described goals through the Competence by Design (CBD) initiative (Frank & Danoff, 2007; RCPSC, 2017). This curricular shift was an adaptation of competency-based training models that did not adjust training time but maintained the focus on acquiring competencies during this timeframe (RCPSC, 2017).

To accomplish the intended goals for CBD implementation, assessments were designed to be more frequent and lower stakes to monitor learner progression and provide ongoing feedback to cultivate competency development (Frank et al., 2017). A considerable portion of the assessment data following the implementation of CBD comes from Entrustable Professional Activities (EPAs), which are evaluations of the specific core skills of a specialty (Frank et al., 2017; Schultz & Griffiths, 2016). The successful completion of an EPA assessment requires the attainment of multiple integrated observable markers of ability, referred to as "milestones" (RCPSC, 2017; RCPSC, 2024). EPAs are mapped to different stages of residency training, and the attainment of these competencies is used to guide progression to the next stage of training (Norman et al., 2014; RCPSC, 2017; RCPSC, 2024).

As part of the transition to CBD, competency committees (CCs) were established to regularly review resident progress and make advancement decisions, including recommendations for progression versus remediation (Acai

et al., 2021; RCPSC, 2017). CCs make decisions using data from various assessment modalities, including clinical evaluations and written exam scores (Acai et al., 2021; RCPSC, 2024). However, within CBD, EPAs make up a considerable portion of the assessment data available to CCs and, as a result, can be particularly influential in the CC decision-making process (RCPSC, 2024). Trainees are also connected with an academic advisor, often called an academic coach, who helps longitudinally coach trainees throughout their residency training, guides learning plans, and may play a role in CC deliberations pertaining to the residents being coached (RCPSC, 2024).

1.2 Evaluating the Implementation of Competence by Design (CBD) and Theoretical Framework

While the transition to CBD was supported by educational theory, concerns were raised before and shortly after implementation started concerning the feasibility and potential impact on the experience of residents and faculty (Hamza et al., 2020; Hawkins et al., 2015). Initially, concerns were raised about the increased administrative requirements and faculty development needs that the transition would bring, logistical and practical issues, and the deficiency of structural models to accommodate learners that deviate from the standard timeline (Hawkins, et al., 2015). Furthermore, there were overarching reductionist concerns about the effectiveness of the broken-down competencies in truly representing clinical competence (Hawkins et al., 2015; Hoang & Lau, 2018). The

longitudinal use of EPAs and milestones aimed to create a progression narrative for trainees and mitigate these concerns (Hoang & Lau, 2018). However, a persistent concern was that it is logistically challenging to evaluate whether CBD assessment modalities capture real-world competence (Hawkins, et al., 2015; Hoang & Lau, 2018). In keeping with this, a study from the Netherlands found that learners who completed a training program with elements of CBME were not necessarily better prepared for medical practice, a finding that emphasized the importance of evaluating the implementation of CBME (Kerdijk et al., 2013).

Van Melle and colleagues (2019) reviewed the importance of applying "fidelity of implementation (FOI)," which is the proportion of competency-based program components that are actually being implemented by a program when evaluating the outcomes and impact. Given the lack of shared understanding of what constitutes a competency-based program, the dynamic nature of training programs, and complex clinical contexts, the FOI of CBME can often be difficult to appraise (Glasgow et al., 2008, Mowbray et al., 2003). To combat these challenges, Van Melle and colleagues (2019) focused on the core components of CBME that could be applied to broad program contexts and, ultimately, developed the Core Components Framework (CCF) for evaluating the implementation of CBME programs.

Within this framework, Van Melle and colleagues (2019) identified four core components, specifically: (1) outcome competencies, (2) sequenced progression, (3) tailored learning experiences, (4) competency-focused

instruction, and (5) programmatic assessment. For outcome competencies, competencies requisite for practice should be clearly defined. Concerning sequenced progression, core competencies should be organized in a logical sequence and progress across the expected duration of training and foster the development of appropriate expertise. Tailored learning experiences describe the role of learning experiences that should directly facilitate the attainment of competencies and emphasize individual learner needs.

The fourth core component defined in the framework is competency-focused instruction (Van Melle et al., 2019). This component emphasizes that teaching practices promote competency acquisition and are individualized to the learner's pace and stage of training. The final core component identified is programmatic assessment, which, as described by Dart and colleagues (2021), involves "a series of interdependent elements of learning and assessment methods that are connected to build upon each other" (p. 1732). For this component, Van Melle and colleagues (2019) stated that "assessment practices support and document the developmental acquisition of competencies" (p. 1005). High-quality programmatic assessment should enable reliable and valid decision-making practices using observation, feedback, establishing standards, and data collection (Van Melle et al., 2019).

1.3 CBD Implementation and the Resident Experience

Data on the outcomes of CBD implementation gradually became available through local and institutional reports and published literature. An example of this was a report from the Fédération des Médecins Résidents du Québec (FMRQ), which provided important insights into the resident experience with the transition to CBD following the third year after implementation (FMRQ, 2020). The FMRQ report noted that the transition to CBD changed the opportunities for feedback, direct observation, and assessments. However, it was unclear whether there was an improvement in the quality or quantity of feedback available to learners. In addition, the FMRQ report raised concerns that direct observation remained infrequent given the additional required effort (FMRQ, 2020). However, past research identified that narrow perceptions of what counts as direct observation may result in these occurrences being underrecognized (Gauthier et al., 2018). Moreover, the report indicated that the promised individualized learning plans, based on CC decisions, were not happening consistently (FRMQ, 2020).

The FMRQ report was in keeping with additional research literature that aimed to evaluate different elements of CBME implementation. Additional research corroborated concerns regarding the quality of written narrative comments that were identified in the FMRQ report and suggested that verbal feedback, which may not be captured on assessment forms, is still perceived as important for learning (Raaum et al., 2019; Tomiak et al., 2020). Since verbal feedback is often not documented, it is difficult to quantify and appraise the total

feedback a trainee receives (Marcotte et al., 2019). This also poses a challenge for programmatic assessment and CCs given that relevant feedback is not necessarily being reliably captured to help guide learner progression decisions (Donato et al., 2016; Marcotte et al., 2019; Van Melle 2021).

Additionally, qualitative studies have been used to explore the diverse perspectives of those involved, including faculty and trainees, following the implementation of CBD. Dubé and colleagues (2023) used interviews to explore these perspectives with residents, chairs, directors, CBD leads, administrators, education scientists, and other pertinent stakeholders at McGill University. These perceptions of CBD implementation included concerns about contextualizing the curriculum and assessment practices with the educational goals of CBD, navigating the new administrative requirements, and making ongoing adaptations to the competency-based structure (Dubé et al., 2023). In addition, trainee perceptions of assessments and CBD are complex, and many factors need to be considered when assessing the educational impact of the assessment shift with CBD implementation (Ott et al., 2022; Watling & Ginsburg, 2019). Further data from trainees indicated that EPAs were felt to improve the clarity of learning goals and promote direct observation (Barret et al., 2017; Martin et al., 2020; Martin et al., 2023; Nathoo et al., 2020). However, trainee perceptions on CBME are framed by culture and the context in which learning occurs (Martin et al., 2023). For example, Ahn and colleagues identified that perceptions of EPAs and their impact on learning were informed by the perceived messaging from the program

to the residents, faculty and their perceived engagement, and learner behaviour (Ahn et al., 2023).

Among residents, previous research has corroborated that there is considerable variation in the perceptions of the value of EPA assessments and that many residents do not fully understand the objectives of CBD (Ahn et al., 2023; Chen et al., 2022). Some trainees have opined that the demands of completing EPAs negatively affected their overall learning experience (Ahn et al., 2023). These findings align with the FMRQ report's conclusions that the prescribed demand for EPAs has created a perception of EPA assessments as a "checklist to be completed as quickly as possible" (FMRQ, 2020, p. 22). Additional research using semi-structured interviews found that residents agreed with the goals of CBME; however, concerns regarding assessment and feedback hindered their experiences with the new curriculum (Branfield Day et al., 2022). Specifically, residents found that assessments did not frequently provide educational benefits and created administrative burdens, performance anxiety, and frustration (Branfield Day et al., 2022).

1.4 Implications of CBD on Resident Well-Being and Burnout

In addition to the above qualitative research, the FMRQ report acknowledged the considerable administrative burden that comes with CBD for both residents and staff physicians (FMRQ, 2020). The report suggested that given the increased cognitive load required by the introduction of CBME, high

levels of stress, anxiety, and exhaustion were prevalent (FMRQ, 2020). Thus, the FMRQ report highlighted the potential impacts of CBD on resident well-being, secondary to the reported challenges with completing EPAs (FMRQ, 2020).

Building on emerging research about the potential implications of CBME on the resident experience, Ott and colleagues (2022) further delineated nine specific assessment burdens experienced by trainees following CBD implementation. Some examples of these burdens included a lack of situational control, lack of trust, unrealistic expectations, and constraints on time and resources (Ott et al., 2022). These assessment burdens stemmed from unmet psychological needs related to CBD, including threats to autonomy, relatedness, and competence (Ott et al., 2022).

Burnout has been defined as a syndrome of multidomain exhaustion that can be caused by occupational stress and is often associated with diminished personal accomplishment, emotional exhaustion, and depersonalization (Ilic et al., 2016; Zhou et al., 2020). In medicine, burnout is regarded as a serious issue because of its impacts on physicians' mental and physical health, which can threaten the viability of the workforce and adversely impact patient care (Hewitt et al., 2020). Medical students and residents report burnout at a higher prevalence than the general population (Dyrbye & Shanafelt, 2016; Mendelsohn, 2022; Zhou et al., 2020). Previously, increased workload for physicians has been suggested to negatively contribute to well-being, burnout, and overall health (Mendelsohn, 2022; Zhou et al., 2020). When specifically looking at trainee physicians,

research from Zhou and colleagues (2020) identified numerous work-related factors as important risk factors for burnout and stress in trainee physicians. For example, poor work environment and work demands were significant factors associated with burnout and stress (Zhou et al., 2020). With significant work demands, Zhou and colleagues (2020) described that training programs could conflict with aspects of life outside of work. From this, they reported that "poor work-life balance" was a significant factor in physician trainee burnout. Given concerns that CBD has brought about an increased workload and the potential implications for a field that is already highly demanding and requires personal sacrifice, it is important to explore the impact of CBME on well-being and burnout among trainees (FMRQ, 2020; Martin et al., 2020; Ott et al., 2022).

1.5 Gaps in the Literature

A previous study quantified the administrative burden for faculty with respect to CBME by exploring time spent completing assessments (Cheung et al., 2021). However, to the best of our knowledge, no studies have attempted to quantify the administrative burden on residents. Despite the additional time and effort required from residents enrolled in CBD curricula (FMRQ, 2020), there is limited evidence about whether residents find these additional efforts worthwhile. Given the concerns raised about resident administrative burden and threats to the learning experience, it is important to understand if residents perceive educational benefits derived from the additional workload they are reporting.

Building on previous research that explores how the CBD implementation process contributed to an administrative burden and burnout, there are limited data that directly links components of CBD, such as assessments, to learner well-being (Ott et al., 2022).

Importantly, research examining the impact of CBD implementation seldom includes a comparison group, making it challenging to determine the specific impact of CBD implementation on the residency experience. Additionally, as previously stated, the FMRQ report described changes to opportunities for feedback, observation, and assessment (FMRQ, 2020). However, how the implementation to CBME changed the quality or quantity of these aspects of the resident experience within the same program is not well described.

1.6 The Present Thesis and Research Objectives

This thesis explores the resident experience within CBD and compares it to those in the traditional residency stream within the Pediatric Residency Program at McMaster University. The study addresses gaps in the literature and contributes to a scholarly understanding of CBD using a two-phased approach: electronic journals (Phase 1) and surveys (Phase 2). With the onset of CBD implementation in Pediatrics in July 2021, the 2022-23 academic year presented a unique opportunity to compare the two groups of residents: those in postgraduate years (PGY) 1 and 2 in the CBME stream and those in PGY 3 and 4 in the traditional non-CBME stream. The study explored the impact of CBD

implementation on various elements of the resident experience, including

assessments, coaching, direct observation, feedback, and well-being.

Chapter 2: Methods

2.1 Context and Design

To accomplish the study objectives, a quantitative sequential exploratory study, as shown in Figure 1, was used to collect data on assessment, coaching, observation, and quality of life and well-being across the two groups: CBME versus non-CBME. Phase 1 of the study involved distributing and collecting electronic journals to document the time residents spent on assessment, while Phase 2 involved an electronic survey to follow up on these findings. The findings from both phases were then considered together to develop a more holistic understanding of assessment, coaching, observation, and quality of life and well-being across CBME and non-CBME residents.

2.2 Participants

The study population consisted of resident physicians in the McMaster Pediatric Residency Training Program, a medium-sized program with 45 residents that is primarily located at McMaster Children's Hospital in Hamilton, Ontario, Canada during the 2022-2023 academic year. Four residents are located at the Kitchener-Waterloo regional campus in Kitchener and Waterloo, Ontario, Canada. All residents in the program ranging from postgraduate year (PGY) 1-4 (n = 45) were eligible to participate. The PGY1 and PGY2 residents were in the CBME stream (n = 24) and the PGY3 and PGY4 residents were in the non-CBME stream (n = 21). Each year had a mix of Canadian and

international medical graduates, which is relevant as differences in undergraduate medical training may lead to differences in residents' preparedness for and experiences with CBME.

2.3 Phase 1: Electronic Journals

Phase 1 took place in January 2023 and involved electronic journals (e-journals) to collect prospective data for a two-week period. The decision to collect data midway through the academic year was made to ensure sufficient time for new residents to adjust to starting the residency program. Recruitment information was provided in an email communication from the principal investigators that was distributed by the residency program director. Participation was voluntary, and e-journals were provided via email to consenting residents. Residents were given a $10 Starbucks gift card upon completion of the e-journal as an incentive.

Consenting residents were provided with a standardized template developed by the primary investigator (SVM) and asked to record the time they spent on assessments and the nature of the activity (i.e., planning, following up, and initiating), frequency of feedback, and frequency of direct observation in their clinical setting for a two-week period. Although the e-journal data were mostly quantitative, free-text questions were included for residents to provide further details of their experience. Findings from the e-journals were used to guide data collection in Phase 2.

2.4 Phase 2: Survey

Phase 2 of the study took place between June and July 2023. Phase 2 used an anonymous survey to ask residents to recall experiences with assessment, supervision, direct observation, and coaching. These survey questions were informed by the findings from the e-journals. For example, Phase 1 showed that CBME residents were spending more time on assessments and, from this, questions were developed to explore whether there were differences in the use of feedback from assessments to guide learning. Recruitment information was provided in an email communication from the residency program director two weeks before the survey was distributed. A link to the consent form and survey through the LimeSurvey platform was provided via email to the resident body. Participation was voluntary, and residents could choose whether they wished to complete the survey. Residents were given a $10 Starbucks gift card upon completion of the survey as an incentive.

The survey questions pertained to assessment, supervision, direct observation, and coaching. While the survey was informed by the existing literature on assessment in CBME, the items were developed by the research team because there were no existing measures in the literature that adequately covered the constructs of interest. Additionally, a similar survey administered by McMaster's Postgraduate Medical Education (PGME) Office in 2021 was used to inform survey development. The main difference between the PGME survey and the present survey was that the present survey explored assessment,

supervision, direct observation, and coaching in greater depth in a specific specialty (i.e., pediatrics), such as by collecting specific information related to the frequency of each activity and exploring the links between these CBME components and resident well-being. In addition, the present survey allowed for a more direct comparison between the CBME and non-CBME cohorts, as not all pediatric residents would have completed the PGME survey, especially first-year pediatric residents enrolled in CBME who were not sent the PGME survey.

The survey was administered using the LimeSurvey platform and included Likert and single-response questions. A sample question is: "I am directly observed by staff physicians (including history, physical, counselling, and discharge instructions with the supervisor physically present observing the encounter or task," with a Likert-type response option ranging from "Never" to "Every day." The survey also included questions with a linear analogue self-assessment tool that incorporated themes from the Maslach Burnout Inventory (MBI) such as emotional exhaustion and depersonalization to gauge burnout, as well as quality of life indicators (West et al., 2012). A sample question is: "I've become more callous towards people since I took this job," with a Likert-type response option ranging from "Never" to "Every day."

The more senior cohorts that were in the traditional stream (i.e., PGY3 and PGY4 residents) were asked additional questions about how their experiences may have changed as they progressed through residency. For example, direct observation frequency was hypothesized to differ between junior and senior

trainees. These additional questions were designed to help interpret any potential differences between the two groups that may not be directly related to CBME implementation.

2.5 Data Analysis

In Phase 1, descriptive statistics were used to compute frequencies, percentages, and means for the e-journal and survey data pertaining to feedback and observation. Categorical data were analyzed using chi-square tests. For continuous data, such as time spent on assessments, the Mann-Whitney U test was used to statistically compare the CBME and non-CBME groups. Statistical significance was considered at $p < .05$. For the e-journal, the free text was read by SVM to identify and summarize any common ideas. This approach was considered appropriate given that very few residents provided narrative comments on the survey, and if they did, these comments were very brief, thus precluding more extensive qualitative analyses.

In Phase 2, descriptive statistics were used to compute frequencies, percentages, and means for the survey data pertaining to feedback and observation. Categorical data, such as the number of trainees endorsing that assessments contribute substantially to their burnout symptoms, were analyzed using chi-square tests. For continuous data, Mann-Whitney U tests were used to compare the CBME and non-CBME groups. Again, statistical significance was considered at $p < .05$.

2.6 Ethics

Ethics approval for this study was obtained from the Hamilton Integrated Research Ethics Board (Project #15043). Permission was also obtained from the Pediatric Residency Program Committee to complete this study.

Chapter 3: Results

3.1 Phase 1: E-Journals

Excluding residents who were away when the study took place (i.e., due to illness, parental leave, or out-of-town rotations), there were 37 eligible residents. For Phase 1, 21 residents provided full responses for the e-journal, for a response rate of 57%. This included ten residents who were in CBME streams and eleven residents in non-CBME streams. Those in CBME streams were postgraduate years (PGY) 1 and 2 while those in the non-CBME streams were PGY 3 and 4. Of the participating CBME residents, four identified as a man, and six identified as a woman. Of the participating non-CBME residents, four identified as a man, and seven identified as a woman.

3.1.1 Direct Observation

During the two weeks, CBME residents had more total direct observation (i.e., from senior residents, fellows, staff physicians, and other healthcare providers) than those in non-CBME streams, with a mean of 4.5 occurrences (range 0-25) versus 1.9 (range 0-4), but this difference was not found to be statistically significant ($p = .29$). When specifically looking at direct observation by the supervising staff physician, there were also no statistically significant differences found between the groups, with a mean of 3.1 occurrences (range 0-20) in the CBME stream and 1.8 (range 0-4) occurrences in the non-CBME stream ($p = .61$)

3.1.2 In-Person Feedback

The two groups had similar occurrences of in-person (versus remote) feedback during the two weeks. The CBME group received in-person feedback 2.5 times on average (range 1-5), with 1.6 of these times being with the supervising staff physician The non-CBME group received in-person feedback on average 2.7 times (range 0-14) with 2.6 of these occurrences being from a staff physician. However, these differences were not found to be statistically significant for the total occurrences of in-person feedback ($p = .47$) or occurrences of in-person feedback by the staff physician ($p = .98$).

3.1.3 Assessments

Over two weeks, CBME residents sent a mean of 6.9 (range 2-19) assessment forms with 6.4 (range 2-18) of these being EPAs. Of these, 61% of forms were incomplete, with 2.7 (range 0-8) of these forms either not completed or expired during the time of the study. On average, 1.9 (range 0-6) of the expired assessment forms were sent to supervising staff physicians, with the remaining forms being sent predominantly to more senior residents and clinical fellows.

For the non-CBME group, fewer assessment forms were attempted during the two weeks ($p < .01$). The non-CBME residents sent a mean of 1.8 (range 0-5) assessment forms and only one non-CBME resident sent an EPA. The assessment forms were either incomplete or expired 0.9 (range 0-5) times during the two weeks, meaning 50% of assessment forms were not completed.

CBME residents reported significantly more time spent on assessment during the two weeks of the study, as described in Table 1. More specifically, CBME residents reported 126 minutes of total time spent on assessments versus 28 minutes for non-CBME residents ($p < .01$). Furthermore, there were differences in reported time spent on planning, initiating, and following up assessments between the two groups (Table 1). During the two weeks, planning assessments was the most time-consuming task related to assessments as reported by the CBME residents. Non-CBME residents spent 10 minutes or less on each action (i.e., planning, initiating, and following up on assessments). Of note, the reported total time spent on assessments by residents was different from the sum of the minutes they reported in the individual categories. For CBME residents, 126 total minutes spent on assessments were reported but the sum of the different categories was 136 minutes. For non-CBME residents, 28 total minutes were reported but the sum of the different categories was 19 minutes.

3.2 Phase 2: Survey

Excluding residents who were on leave, vacation, or out-of-town clinical rotations, 37 residents were eligible to complete the survey. The survey response rate was 60%, with 22 residents providing full responses. Of these full responses, 15 were from CBME residents and seven were from non-CBME residents. The CBME residents included those in PGY 1 and 2 and the non-CBME residents included those in PGY 3 and 4. Of the participating CBME residents, six identified

as a man, and nine identified as a woman. Of the participating non-CBME residents, three identified as a man, and six identified as a woman. The full survey results are presented in Table 2.

There were no significant differences between responses to questions about feedback, except to the question "I receive feedback on my performance from staff physicians," for which the non-CBME group had a mean of 2.75 which corresponded to "weekly", versus 2.07 in the CBME group which corresponded to "monthly" (p = .03). Furthermore, the CBME group reported more frequent completion of assessment forms by senior residents and fellows than the non-CBME group, with a mean of 4.27 (SD = 1.33, "A few times per month") compared to 3.14 (SD = 1.46, "Once a month") in the non-CBME group (p = .05). CBME residents also endorsed that the time spent on assessments felt more burdensome to them than did the non-CBME group (p = .02). CBME residents were less likely to endorse that they had adequate clinical opportunities (M = 2.73, SD = 1.10, "Neither agree nor disagree," p = .03), support (M = 2.93, SD = 1.03, "Neither agree nor disagree," p = .01), and time (M = 2.87, SD = .99, "Neither agree nor disagree," p = .02) to complete their required assessments.

Concerning feedback and direct observation, the CBME group was more likely to endorse that they "receive verbal feedback about my performance from my supervisors" (p = .03) and are "directly observed by staff physicians" (p = .02). The non-CBME residents were asked "As a senior resident, the following best describes how often I am directly observed relative to when I was a junior

resident" and the mean response was "Somewhat less frequently than when I was a junior resident" (M = 2.00, SD = 1.00).

With respect to resident well-being, there were similar endorsements of burnout (p = .47) and depersonalization (p = .40) between the two groups. However, in the CBME group, clinical assessments were more likely to be attributed to feelings of burnout (M = 3.67, SD = 1.11, "To a large extent") than in the non-CBME group (M = 2.14, SD = 1.46, "To a small extent", p = .02).

Chapter 4: Discussion

4.1 The Impact of CBD on the Resident Experience

This two-phased, quantitative exploratory study examined the impact of CBD implementation on residents across areas such as assessment, observation, quality of life, and well-being. Past research examining the impact of CBD implementation has rarely included a comparison group, making it difficult to draw specific conclusions. At the time of the present study, there were two cohorts in the CBME stream and two in the non-CBME stream within McMaster's Pediatric Residency Program. This presented a unique opportunity to explore the impact of CBD implementation on the experience of residency within a single residency program.

In Phase 1, 21 residents completed the e-journals, which provided insight into how the day-to-day experience has changed within the residency program after CBD implementation. We found that the CBME cohorts had significantly more assessment forms completed. However, this did not translate into a statistically significant amount of direct observation or in-person feedback.

Phase 2, which involved a survey completed by 22 residents, allowed for further delineation of the resident experience between the CBME and non-CBME cohorts. The CBME residents were more likely to endorse receiving verbal feedback about their performance from supervisors and were directly observed by staff physicians. Concerning feedback, non-CBME residents were more likely

to endorse feedback on their performance from staff physicians. This may be because senior residents often interact more directly with staff physicians.

Taken together, the two phases provide insight into how the resident experience concerning feedback and direct observation is largely similar between the CBME and the non-CBME cohorts. Programmatic assessment, one of the core components of the CCF proposed by Van Melle and colleagues (2019), enables a defensible approach to decision making. It does this through robust standards, data collection, observation, and feedback. Given our findings, concluding that the programmatic assessment has considerably improved with the formal implementation of CBD is difficult.

Given that the CBME residents in this study were more junior than the non-CBME residents since the CBME versus non-CBME designation corresponds to whether the participant started residency before or after the official launch of CBD, additional questions were included in the survey to gauge the perspective of the more senior non-CBME residents about how their resident experience has evolved as they progressed through training, providing additional context to any differences seen in direct observation and feedback opportunities. Concerning feedback on clinical performance, the non-CBME residents, who were PGY3 and 4 residents, endorsed that this was occurring at "approximately the same frequency" as when they were junior residents. The non-CBME residents reported being directly observed "somewhat less frequently" than junior residents. This corroborates our survey findings that the CBME, who were more

junior, were more likely to endorse being directly observed by staff physicians. From these data, it is difficult to determine if this difference stems from the implementation of CBD or the resident's stage of training.

4.2 Challenges with CBD Implementation

Before CBD implementation, concerns were raised about physician preparedness for independent practice, given that training may not provide sufficient clinical opportunities to develop the required skills (Bismilla et al., 2015; Daniels et al., 2014; Holmboe, 2021). Our findings showed that CBME residents were less likely to endorse having adequate support, time, and clinical opportunities to complete the clinical assessments required to progress than non-CBME residents. Past research has suggested that CBD implementation provided residents with a clear roadmap for progression through residency (Barrett et al., 2017; Martin et al., 2023). As such, it is difficult to determine whether our findings are the result of residents being more aware of the expectations required for independent practice or from navigating the additional cognitive load associated with CBD implementation. Within the CCF, there are challenges with achieving outcome competencies, a desired sequenced progression, and tailored learning experiences if trainees do not have the required support, time, and clinical opportunities.

Furthermore, our study findings are in keeping with the concerns raised by the FMRQ report in that it is not clear if there is increasing direct observation and

high-quality feedback being delivered despite an increasing number of EPAs being completed (FMRQ, 2020). The challenges described in CBD implementation support the findings presented in the FMRQ report and elsewhere in the literature (FMRQ, 2020; Hall et al., 2020). Multiple studies have explored challenges with the engagement of faculty and residents with various elements of CBD (Boet et al., 2016; Hall et al., 2020; Mann et al., 2020). For example, Fraser and colleagues (2017) suggested that additional support, time, and resources are needed to promote engagement in CBME programs. Our findings showed that CBME residents are less likely to endorse having adequate support and time, and this could be due to the increased resource requirements for adequate participation in CBME.

Limited literature is available exploring CBD implementation and potential challenges specific to pediatrics. However, Menezes and colleagues (2018) described challenges in applying the rigid structure of CBD to the practice of psychiatry, which has fewer clear outcome measures than surgical and other procedural specialties. Pediatrics as a specialty has considerable counseling demands and requires many overlapping competencies as psychiatry, making it possible that similar challenges exist within this field.

Mann and colleagues (2020) suggested that the CBD implementation process requires local resident feedback and opportunities for engagement, leadership, and advocacy to help combat the challenges encountered with different elements of CBME. In addition to resident leadership, institutional

leadership is needed to support the factors external to the training program that can impact residents' educational experiences (Fraser et al., 2017). Szulewski and colleagues (2023) noted that "intentional system changes and allowances are needed to provide faculty with the time and bandwidth to perform this important task, rather than just telling faculty and residents that they need to 'do more' with the time they have'" (p. 1265). As a result, discussions are needed at the departmental and institutional levels to support adaptations that could potentially mitigate the issues arising from CBD implementation. An example would be finding ways to incentivize faculty engagement in the assessment process to encourage EPA completion, such as through faculty report cards that review the quality of feedback they give trainees (Szulewski et al., 2023).

4.3 Administrative Burden and Well-Being

Using the e-journals, the CBME residents in our study reported spending significantly more time on assessments throughout the two weeks. Specifically, they reported spending more time planning, initiating, and following up on their assessments compared to their CBME counterparts. Along similar lines, CBME residents were significantly more likely to endorse that the amount of time they spend on assessments feels significant, with a mean response of "Strongly Agree" to this item in the Phase 2 survey. These findings serve as quantitative indicators of the administrative burden that is becoming well-described in the CBME literature (FMRQ, 2020; Ott et al., 2022; Watling & Ginsburg, 2019). In

addition, as discussed earlier, CBME residents were less likely to endorse having adequate support, time, and clinical opportunities to complete their assessments. Thus, our findings also contribute to the previously documented concerns about CBME imposing additional cognitive load and, ultimately, acting as a stressor for residents with potential downstream well-being concerns (FMRQ, 2020; Ott et al., 2022; Watling & Ginsburg, 2019).

Another critical area we explored was burnout. Burnout has previously been identified as pervasive among staff physicians and trainees (Zhou et al., 2020). Ultimately, the results of our study corroborate these findings as there was a notable endorsement of burnout and depersonalization among both CBME and non-CBME residents. Ott and colleagues (2022) have suggested that EPAs and CBME can negatively impact learner well-being, in addition to intrinsic motivation, given the unmet psychological needs introduced by the additional administrative burden they impose. These unmet psychological needs included threats to autonomy such as missed opportunities to self-regulate, comparative assessment, and lack of self-control (Ott et al., 2022). This is relevant to our survey findings described earlier, where CBME residents had concerns about sufficient time, support, and clinical opportunities to complete their assessments.

Another unmet psychological need discussed by Ott and colleagues (2022) was threats to relatedness. Ott and colleagues (2022) defined relatedness as "the need to feel belonging or care in one's social system" (p. 586). Threats to relatedness included a lack of time and energy, which directly pertains to our

findings of increased time spent on assessments in the CBME group and increased endorsement of spending a significant amount of time on assessments. The last unmet psychological need that Ott and colleagues (2022) discussed was threats to competence, including lack of clarity, unrealistic expectations, and EPA forms not necessarily providing feedback. This is supported by our findings given the additional time spent planning assessments reported by the CBME residents; however, these same residents in our study endorsed that they used the feedback from their assessment forms to help guide their learning. Of note is that the use of feedback from assessment forms was similarly endorsed by non-CBME residents who do not routinely use EPA forms.

CBME residents in our study were significantly more likely to attribute their feelings of burnout to their clinical assessments, including EPAs. Given the role of assessments in the burnout of CBME residents, it will be necessary for future research to explore how residency training as a whole can act as a contributing factor towards burnout. Another consideration is the impact of the administrative burdens imposed by CBME on supervising physicians. Past research has quantified the additional time requirements for faculty completing assessments within a CBME program and found that completing assessments added approximately 18 minutes of additional work per staff physician in each month-long clinical block, assuming the work is evenly distributed across all staff members (Cheung et al., 2021). Cheung and colleagues (2021) concluded that this administrative burden could be reasonable given the potential benefits of

CBME. However, there are concerns that the additional burden on faculty can impact the educational experience of trainees as faculty may be less invested in their educational duties (Szulewski et al., 2023).

Compared to the findings from Cheung and colleagues (2021) for faculty administrative burden, our results from the e-journals quantified that residents in the CBME cohort spent 126 minutes on assessments during the two weeks, significantly more time than their non-CBME colleagues. Previous research has shown that increased physician workload negatively contributes to well-being, burnout, and overall health (Mendelsohn, 2022; Zhou et al., 2020). Given the added administrative time commitment to resident workload following CBD implementation, it is important to vigilantly monitor learner well-being and ensure that this additional time commitment comes with an adequate educational benefit.

Szulewski and colleagues (2023) used a qualitative approach to learn how programs across Canada adapt to the assessment burden of CBME implementation. They identified three themes to address with adaptations, namely disparate mental models of assessment processes in CBME, challenges with performance review and decision-making, and challenges with workplace-based assessment processes (Szulewski et al., 2023). For disparate mental models of assessment, some adaptations included revising entrustment scales based on feedback, offering faculty development, and having a process to share tips and tricks for assessment completion amongst the educational team (Szulewski et al., 2023). Major concerns regarding performance review and

decision-making challenges are related to monitoring performance and competence committee decision-making processes (Szulewski et al., 2023). Possible adaptations to address the challenges of monitoring performance included improving the software used to track assessments, generating additional tracking sheets and graphs, and encouraging professional development among faculty (Szulewski et al., 2023). One suggested adaptation for the competence committees was to become more transparent by adding a resident representative. As discussed earlier, challenges with workplace-based assessments, such as EPAs, have contributed to a growing administrative burden for faculty and residents (Szulewski et al., 2023). The suggested adaptations for these challenges included dedicated clinical time for faculty with the purpose of direct observation and planning assessments in advance (Szulewski et al., 2023).

4.4 Implications

This research has important implications for the scholarly and practical understanding of how CBME implementation has impacted the resident experience. In keeping with the recent FMRQ report, our data suggested that the implementation of CBME did not clearly deliver on its aims to increase direct observation and provide more high-quality opportunities for feedback and assessment (FMRQ, 2020).

Our findings contribute to the growing body of work defining the administrative burden of CBME implementation and its possible implications on resident burnout. As previously discussed, recent research from Ott and colleagues (2022) described how unmet psychological needs contribute to feelings of burnout related to the administrative burden of CBME. Our results support these findings by showing that burnout is pervasive among CBME and non-CBME resident physicians within our training program. Still, those trainees in CBME streams are significantly more likely to endorse clinical assessments, including EPAs, as a contributing factor to their burnout.

The findings from Phases 1 and 2 contribute to our understanding of the relationship between CBME, the administrative burden, and physician burnout. Research has previously shown that work environment, work-life balance, and other environmental factors contribute to trainee physician burnout (Zhou et al., 2020). Our e-journal findings showed that CBME residents spent significantly more time on assessments, which can conceivably impact work-life balance. Additionally, our survey findings showed that CBME residents were more likely to endorse that the time they spent on assessments felt significant to them. Concerning the work environment, our survey findings also identified that CBME residents reported insufficient support, time, and clinical opportunities to complete assessments. More research is needed to fully understand these findings and learn more about how implementing CBD in Canada could contribute to burnout in resident physicians.

4.5 Limitations

As noted earlier, since pediatric residents transitioned to CBME in July 2021, a potential limitation is that the CBME cohorts in this study were more junior than the non-CBME cohorts. The stage of training can conceivably influence the direct observations, feedback, and assessments a resident receives and is, therefore, a confounding variable in this study. However, additional questions were included in the survey for the senior residents in the non-CBME group to gauge how these aspects of the resident experience have evolved throughout their training. The non-CBME residents, comprising PGY3 and 4 residents, reported that they were directly observed "somewhat less frequently" and endorsed that feedback was being provided at "approximately the same frequency" as when they were junior residents. In future research building on the findings of this project, qualitative methods can be used to gain further insight into how feedback, direct observation, and assessment practices differ between the two groups. An additional limitation, particularly within the non-CBME group, is that trainees may have had varying background knowledge about the concepts pertaining to CBD. However, in both phases, the questions did not require an understanding of these concepts to answer as they focused on residents recalling specific experiences.

With the July 2021 transition date, it is important to note that the data collection began approximately 18 months after CBD implementation. Future research could describe how CBD implementation has impacted the resident

experience with more time for training programs to adapt to feedback from faculty and trainees.

An additional limitation Is that our study relied on self-reporting for both the e-journals and the survey. This can be subject to biases as the result of many different factors, such as the recall period, which was defined by Fadnes and colleagues (2009) as the "period of time over which respondents are required to remember past events in order to answer a question" (p. 2). Generally, the accuracy of recall decreases over time. Furthermore, selective recall, where some events are more easily recalled than others, could impact the self-reporting in both phases of our study (Fadnes et al., 2009). It is also important to consider the Hawthorne effect in the context of our study (Sedqwick & Greenwood, 2015). This Hawthorne effect describes how humans can, often unintentionally, modify their behaviour when being studied or observed (Sedgwick & Greenwood, 2015). Our study aimed to mitigate these effects by including the e-journals that used prospective self-reporting over a two-week period to complement the survey data and we plan to further expand on our findings with qualitative research and additional longitudinal data collection.

Given that the survey questions were designed specifically for this project, not every question was from a previously validated bank. However, to mitigate this, we included a previously validated linear analogue self-assessment tool with single questions that were previously validated to be indicative to the broader categories of emotional exhaustion and depersonalization from the MBI (West et

al., 2012). Furthermore, survey questions were designed using the results from the first phase of the project, which was useful for further exploring the findings from the e-journal.

This study was completed in a single training program, given that the previously described unique opportunity was given to compare CBME and non-CBME residents in an otherwise similar training environment. However, caution must be taken when applying our findings to programs at different centers or in different medical specialties. Past work has suggested that CBME elements face different challenges when applied to other areas of clinical work (Menezes et al., 2018). Data from a pediatric training program may be more relevant to other medical training programs or specialties that have overlap. For example, data for pediatrics might have more transferability to a training program such as internal medicine as they have similar breadth of competencies but in a different patient population. In contrast, the data collected for a pediatric program might be less transferable to a neurosurgery or pathology training program. Further research is needed to explore how implementation is impacted by clinical specialty. As more programs transition to CBME, it will become increasingly challenging to include a non-CBME comparison group to discern the specific impact of CBME implementation. As such, our findings provide valuable insight into the potential impacts of CBME implementation on the resident experience despite the limitations.

4.6 Next Steps

The findings of this thesis provide insight into ways the resident experience has changed following CBD. We conclude that CBME implementation within a single pediatrics training program did not significantly improve the reported opportunities for direct observation and feedback, a similar notion to that identified in other literature (FMRQ, 2020). Future work should use qualitative research methods, such as interviews and focus groups, to obtain additional details, understand additional contextual factors, and look for more subtle ways that CBME might have changed these aspects of the resident experience. For example, learning more about how feedback is being delivered since CBME implementation, given the faculty development process and the emphasis on coaching, would provide valuable insights into whether the educational practice is improving, even if this is not necessarily reflected quantitatively.

We described an administrative burden for residents in CBME streams by showing increased amounts of time spent on assessments. Further exploration is needed to clarify the educational benefit of this time investment. Given this increased administrative burden and time investment, it is imperative that future research clearly demonstrates that residents are having improved educational experiences and performance outcomes, particularly given that our findings suggest that this is contributing to resident burnout.

Tables and Figures

Figure 1: Overview of the study design.

Table 1: Time spent on assessments during the two-week study period by both CBME and non-CBME residents.

		Planning, *minutes*	**Initiating,** *minutes*	**Following Up,** *minutes*	**Other,** *minutes*
CBME	Mean (Range)	53 (10-120)	41 (10-90)	32 (0-120)	10 (0-60)
Non-CBME	Mean (Range)	1 (0-15)	10 (0-60)	2 (0-7)	6 (0-60)

Table 2: Survey results for non-CBME and CBME groups.

Item	Non-CBME Mean (St Dev)	CBME Mean (St Dev)	*p*-value
I receive feedback about my clinical performance from my supervisors	3.88 (0.35), "Agree"	3.73 (0.46), "Agree"	.46
The feedback I receive from my supervisors is often actionable or helpful for my learning	3.38 (0.74), "Neither Agree nor Disagree"	3.33 (0.82), "Neither Agree nor Disagree"	.91
As a senior resident, the following best describes how often I receive feedback on my clinical performance relative to when I was a junior resident	2.75 (0.71), "Approximately the same frequency as when I was a junior resident"	-	N/A
I receive feedback on my clinical performance from staff physicians	2.75 (0.46), "Weekly"	2.07 (0.70), "Monthly"	.03*
I receive feedback on my clinical performance from senior residents/fellows	2.29 (0.95), "Monthly"	2.73 (1.03), "Weekly"	.44

I receive written actionable feedback (i.e., MedSIS EPAs, WBAs, ITARs, etc.) about my performance from my supervisors	3.50 (0.76), "Agree"	3.60 (0.74), "Agree"	.89
When being supervised by a staff physician, they will complete assessment forms (e.g., EPAs, WBAs) for me	3.43 (1.13), "Once a month"	3.27 (0.70), "Once a month"	.68
When being supervised by a senior resident/ fellow, they will complete assessment forms (e.g., EPAs, WBAs) for me	3.14 (1.46), "Once a month"	4.27 (1.33), "A few times per month"	.05
I receive verbal feedback about my performance from my supervisors	4.29 (0.49), "Agree"	3.73 (0.46), "Agree"	.03*
I use the feedback from my assessments to guide my learning	3.71 (0.76), "Agree"	3.53 (0.74), "Agree"	.70
In general, there are sufficient opportunities during my rotations to get the clinical assessments that I need to progress	3.86 (0.69), "Agree"	2.73 (1.10), "Neither Agree nor Disagree"	.03*

The amount of time I spend on assessments (i.e., planning, triggering, following up, etc.) feels significant to me	2.86 (1.77), "Neither Agree nor Disagree"	4.53 (0.92), "Strongly Agree"	.02*
I am directly observed by staff physicians (including history, physical, counselling, discharge instructions, etc., with the supervisor physically present observing the encounter or task)	3.71 (1.11), "A few times per month"	2.53 (0.74), "Once a month"	.02*
I am directly observed by fellows/senior residents (including history, physical, counselling, discharge instructions, etc., with the supervisor physically present observing the encounter or task)	3.29 (1.70), "Once a month"	3.07 (1.10), "Once a month"	1.00
As a senior resident, the following best describes how often I am directly observed relative to when I was a junior resident	2.00 (1.00), "Somewhat less frequently than when I was a junior resident"	-	N/A

I currently have the support that is required to complete my required clinical assessments	4.29 (0.76), "Agree"	2.93 (1.03), "Neither Agree nor Disagree"	.01*
I currently have the time that is required to complete my required clinical assessments	4.00 (0.58), "Agree"	2.87 (0.99), "Neither Agree nor Disagree"	.02*
I currently have the resources that are required to complete my required clinical assessments	4.00 (1.00), "Agree"	3.00 (1.13), "Neither Agree nor Disagree"	.07
How often do you feel burned out from work	4.43 (1.40), "A few times per month"	4.87 (1.46), "Once a week"	.47
Clinical assessments (e.g., EPAs, WBAs, ITARs, etc., not written examination) contribute to my feelings of burnout	2.14 (1.46), "To a small extent"	3.67 (1.11), "To a large extent"	.02*

How often do you feel detached or more callous toward people	4.14 (1.35), "A few times per month"	4.8 (1.32), "Once a week"	.40
Clinical assessments (e.g., EPAs, WBAs, ITARs, etc., not written examinations) have contributed to me feeling detached and more callous toward people	1.71 (1.15), "To a small extent"	2.73 (1.33), "To a moderate extent"	.07

*= significant at $p < 0.05$

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Appendix 1: Electronic Journal

Electronic Journals		
Name:	Tally	
Date of Time Period Recorded:	By Staff	By Residents or Fellows
Number of times you were directly observed (this includes history, physical, counselling, discharge instructions, etc. with the supervisor physically present observing the encounter or task)		
Number of times you received in-person feedback		
Number of entrustable professional activity (EPA) evaluations or other forms of written feedback forms (Work based assessments (WBA), ITARs, etc.) completed		
Amount of time spent (mins):		
Planning and mapping assessments (incl. EPAs)		
Triggering/sending assessments to supervisors		
Following up on assessments (I.e. reminding supervisors, checking that assessments are completed, etc.)		
Other time spent on assessments		
Please use this space to explain what "other time spent on assessments included"		

Appendix 2: Survey

1. What is your current year of training?
   a. PGY 1
   b. PGY 2
   c. PGY 3
   d. PGY 4
   e. >PGY 4

2. Which do you identify as? [Select all that apply]
   a. Woman
   b. Man
   c. Trans woman
   d. Trans man
   e. Gender non-conforming
   f. Gender fluid
   g. Genderqueer
   h. Non-binary
   i. Two-spirit (as it relates to gender)
   j. Not sure or questioning
   k. Other [Please specify]
   l. Prefer not to answer

3. Are you in a Competency by Design training model?
   a. Yes
   b. No

4. I receive feedback about my clinical performance from my supervisors:
   a. Strongly Agree
   b. Agree
   c. Neither Agree nor Disagree
   d. Disagree
   e. Strongly Disagree

5. The feedback I receive from my supervisors is often actionable or helpful for my learning:
   a. Strongly Agree
   b. Agree
   c. Neither Agree nor Disagree
   d. Disagree

e. Strongly Disagree

6. I receive feedback on my clinical performance from **staff physicians**:
   a. Almost Never
   b. Monthly
   c. Weekly
   d. Every few days
   e. Daily

7. I receive feedback on my clinical performance from **senior residents/fellows**:
   a. Almost Never
   b. Monthly
   c. Weekly
   d. Every few days
   e. Daily

8. **Question for residents PGY3 and above:** As a senior resident, the following best describes how often I receive feedback on my clinical performance relative to when I was a junior resident:
   a. Considerably less frequently than when I was a junior resident
   b. Somewhat less frequently than when I was a junior resident
   c. Approximately the same frequency as when I was a junior resident
   d. Somewhat more frequently than when I was a junior resident
   e. Considerably more frequently than when I was a junior resident
   f. Not applicable

9. I receive **written actionable** feedback (i.e., MedSIS EPAs, WBAs, ITARs, etc.) about my performance from my supervisors:
   a. Strongly Agree
   b. Agree
   c. Neither Agree nor Disagree
   d. Disagree
   e. Strongly Disagree

10. When being supervised by a **staff physician**, they will complete assessment forms (e.g., EPAs, WBAs) for me:
    a. Never
    b. A few times a year or less

     c. Once a month
     d. A few times per month
     e. Once a week
     f. A few times per week
     g. Every day

11.   When being supervised by a **senior resident/ fellow**, they will complete assessment forms (e.g., EPAs, WBAs) for me:
     a. Never
     b. A few times a year or less
     c. Once a month
     d. A few times per month
     e. Once a week
     f. A few times per week
     g. Every day

12.   I receive **verbal** feedback about my performance from my supervisors:
     a. Strongly Agree
     b. Agree
     c. Neither Agree nor Disagree
     d. Disagree
     e. Strongly Disagree

13.   I use the feedback from my assessments to guide my learning:
     a. Strongly Agree
     b. Agree
     c. Neither Agree nor Disagree
     d. Disagree
     e. Strongly Disagree

14.   In general, there are sufficient opportunities during my rotations to get the clinical assessments that I need to progress:
     a. Strongly Agree
     b. Agree
     c. Neither Agree nor Disagree
     d. Disagree
     e. Strongly Disagree

15.   The amount of time I spend on assessments (i.e., planning, triggering, following up, etc.) feels significant to me:
      a. Strongly Agree
      b. Agree
      c. Neither Agree nor Disagree
      d. Disagree
      e. Strongly Disagree

16.   I am directly observed by **staff physicians** (including history, physical, counselling, discharge instructions, etc., with the supervisor physically present observing the encounter or task):
      a. Never
      b. A few times a year or less
      c. Once a month
      d. A few times per month
      e. Once a week
      f. A few times per week
      g. Every day

17.   I am directly observed by **fellows/senior residents** (including history, physical, counselling, discharge instructions, etc., with the supervisor physically present observing the encounter or task):
      a. Never
      b. A few times a year or less
      c. Once a month
      d. A few times per month
      e. Once a week
      f. A few times per week
      g. Every day

18.   **Question for residents PGY3 and above:** As a senior resident, the following best describes how often I am directly observed relative to when I was a junior resident:
      a. Considerably less frequently than when I was a junior resident
      b. Somewhat less frequently than when I was a junior resident
      c. Approximately the same frequency as when I was a junior resident
      d. Somewhat more frequently than when I was a junior resident
      e. Considerably more frequently than when I was a junior resident
      f. Not applicable

19. I currently have the support that is required to complete my required clinical assessments:
   a. Strongly Agree
   b. Agree
   c. Neither Agree nor Disagree
   d. Disagree
   e. Strongly Disagree

20. I currently have the time that is required to complete my required clinical assessments:
   a. Strongly Agree
   b. Agree
   c. Neither Agree nor Disagree
   d. Disagree
   e. Strongly Disagree

21. I currently have the resources that are required to complete my required clinical assessments:
   a. Strongly Agree
   b. Agree
   c. Neither Agree nor Disagree
   d. Disagree
   e. Strongly Disagree

Quality of Life and Well-Being

1. How often do you feel burned out from work:
   a. Never
   b. A few times a year or less
   c. Once a month
   d. A few times per month
   e. Once a week
   f. A few times per week
   g. Everyday

2. Clinical assessments (e.g., EPAs, WBAs, ITARs, etc., not written examination) contribute to my feelings of burnout:
   a. Not at all
   b. To a small extent
   c. To a moderate extent
   d. To a large extent

   e. To a very large extent

3. How often do you feel detached or more callous toward people:
    a. Never
    b. A few times a year or less
    c. Once a month
    d. A few times per month
    e. Once a week
    f. A few times per week
    g. Everyday

4. Clinical assessments (e.g., EPAs, WBAs, ITARs, etc., not written examinations) have contributed to me feeling detached and more callous toward people:
    a. Not at all
    b. To a small extent
    c. To a moderate extent
    d. To a large extent
    e. To a very large extent