The Brain Medicine Fellowship: A Competency-Based Training Program to Treat Complex Brain Disorders

Sarah Levitt, MSc, MD, Alex Henri-Bhargava, MDCM, MScCH, David B. Hogan, MD, Kenneth Shulman, MD, SM, and Sara B. Mitchell, MD, MPH

Abstract

Problem
Complex brain disorders involve symptoms in the domains of affect, behavior, and cognition. It is increasingly recognized that there is a need for a novel type of physician who can treat individuals with these conditions in an interdisciplinary fashion to best address their complexity. Few training programs have focused on the education of such practitioners.

Approach
The authors outline the development and practices of the Brain Medicine Fellowship, an innovative, competency-based fellowship program at the University of Toronto Temerty Faculty of Medicine that accepts trainees from multiple brain medicine–related specialty training programs to develop expertise in integrative assessment and treatment of complex brain disorders. The authors describe how brain medicine competencies were generated, the current assessment process, and the seminal clinical experience associated with the fellowship—the Brain Medicine Clinic—and explain how it exemplifies brain medicine in action.

Outcomes
The first fellow was registered from July 2019 to December 2020. As of December 2022, 3 fellows have entered the program, with 3 more anticipated to begin in July 2023. More than 26 supervisors are associated with the fellowship, who offer a diversity of experiences for fellows to choose from in developing their individualized learning plans. The Brain Medicine Fellowship not only fosters the development of a novel type of clinician (a brain medicine specialist) but also is innovative in its educational design as one of the first nonsurgical fellowships to implement competency-based medical education and has resulted in original clinical programming in the form of the Brain Medicine Clinic, which benefits patients and their caregivers.

Next Steps
The development of the Brain Medicine Fellowship continues with competency refinement and translation into entrustable professional activities and constituent milestones. A comprehensive program evaluation will be completed by 2025.

Problem

The need for physicians who can manage complex brain disorders,[1] defined here as disorders with symptoms in at least 2 domains of affect, behavior, and cognition, is increasingly being recognized. The current culture of specialized medicine presents constraints in the training and practice of those treating brain disorders due to the often singular perspectives of practitioners and the lack of interdisciplinary organizational structures, such as brain sciences programs.[1,2] Calls for equipping clinicians with skills that permit an integrated approach to complex brain disorders are becoming louder,[1–4] but few programs have made this their focus.

We describe the creation of the Brain Medicine Fellowship based at the University of Toronto (U of T) Temerty Faculty of Medicine. This fellowship relies on Frodeman's definition that "interdisciplinarity refers to the *integration* [emphasis added] of knowledge across disciplines."[5] The fellowship promotes the development of interdisciplinary skills related to caring for patients with complex brain disorders. It is novel in its approach to training practitioners to manage complex brain disorders and in being one of the first programs to apply a competency-based medical education (CBME) model to fellowship training.[6,7]

Approach

The Brain Medicine Fellowship was developed as a joint initiative of faculty members of the psychiatry, neurology, neurosurgery, and medicine departments. Program development began in 2011 after a clinician (K.S.) at the U of T Department of Psychiatry convened an interdisciplinary meeting of specialist physicians and medical educators from across Canada to discuss developing a training program to promote brain medicine. The fellowship teaches trainees to care for individuals with complex brain disorders in an integrated and collaborative manner within an interdisciplinary program structure. A unique feature of the fellowship is that fellows may enter the program from multiple specialties, including geriatric medicine, neurology, neurosurgery, physical medicine and rehabilitation (PM&R), and psychiatry.

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

Correspondence should be addressed to Sarah Levitt, Toronto General Hospital, 200 Elizabeth St., Eaton Wing N Eighth Floor, Room 8EN-239, Toronto, ON M5G 2C4, Canada; email: sarah.levitt@uhn.ca.

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On entry into the program, each brain medicine fellow is paired with a coach from outside their specialty of origin who has a shared academic focus (e.g., medical education, clinical research, quality improvement). Coaches are recruited by identifying clinicians working in brain medicine specialities who have a reputation for supporting trainees. Before commencing, fellows meet with their coaches to identify gaps in their clinical training and determine an individualized learning plan that acts as a guide for the creation of their clinical schedule. Clinical opportunities are chosen from a roster of experiences hosted by clinicians with an interest in brain medicine (see Chart 1 for 2 sample weekly schedules). To develop this roster of supervisors, in June 2021, the associate director of the fellowship (S.L.) engaged individuals in clinical settings associated with the U of T Faculty of Medicine who treat patients with complex brain disorders. Fellows are also expected to complete an academic project during their fellowship. It typically takes 6 to 12 months to complete the fellowship.

The brain medicine competencies were drafted to support an emerging field of clinical practice. Initial competency development began in 2013 and was led by a neurologist (A.H.-B.) with expertise in educational methods. A psychiatrist (K.S.) and geriatrician (D.H.) provided feedback on an initial list of competencies.[8] In October 2021, the competencies were further revised by the Competency Development Committee, which consisted of a geriatrician, 2 neurologists (including S.M.), a PM&R physician, and a psychiatrist (S.L.). This committee reviewed the literature to understand the gaps and barriers faced by individuals with complex brain disorders when seeking care and used this information to inform the development of integrated competencies. Committee members also used lived experience treating this patient population to identify the elements of their skill set that were necessary to include in the integrated competencies. Competencies are organized in relation to symptom domains that might be assessed by a brain medicine specialist (see Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/B382 for the brain medicine competencies related to disordered cognition as an example).

The Brain Medicine Fellowship's competency document is composed of a set of standard competencies that each fellow must achieve and a list of elective competencies. Fellows are guided by their coaches to use their individualized learning plans to select a number of these elective competencies to complete. The fellowship director (S.M.) approves fellows' final set of competencies and learning plan. At the beginning of each rotation, supervisors and fellows jointly determine which competencies will be prioritized for completion in that practice setting. The fellowship director contacts supervisors monthly to collect the results of frequent, low-stakes evaluations and to receive updates on fellows' progress. The Brain Medicine Fellowship Competency Committee conducts a formal review of fellows' progress on a semiannual basis. Fellows graduate once they have achieved the standardized competencies, as well as the specific set of competencies relevant to their learning plan (see Figure 1 for the program map).

The Brain Medicine Clinic (BMC) was developed as a pilot demonstration of brain medicine in action. All fellows participate in the clinic on a weekly basis as the core longitudinal experience of the fellowship, where the practice of integrated evaluation and treatment is modeled. An attending neurologist and psychiatrist jointly supervise all new consultations in weekly clinic rounds with all fellows present. Specialists from other brain medicine disciplines (e.g., geriatric medicine, PM&R, neurosurgery) join rounds on a monthly basis during which cases requiring their expertise are discussed to foster broader interdisciplinary diagnostic and management approaches. The practice of brain medicine (i.e., an interdisciplinary approach to disorders that involve affect, behavior, and cognition) is modeled for learners because each case is understood through multiple skill sets simultaneously. Patients are offered care plans that combine the approaches of the different relevant specialties. Shared language and formulation develop around cases as they are discussed such that patients receive a synthesized understanding of their conditions, which can be used as a framework to guide their care.

The Brain Medicine Fellowship is financed through a combination of philanthropic support and funding from various divisions and departments at U of T. These contributors have provided seed funding to develop this program, but the fellowship's long-term financial sustainability is not ensured. As the Brain Medicine Fellowship becomes better established (and can demonstrate proven positive educational and clinical outcomes), we intend to apply for more secure funding (e.g., to the Royal College of Physicians and Surgeons of Canada as an area of focused competency).

Chart 1

Sample Weekly Fellowship Schedules for Trainees From Different Specialties of Origin, July to December 2020

Specialty	Monday	Tuesday	Wednesday	Thursday	Friday
Psychiatry					
Morning	Neurostimulation	Neuropathology	Brain medicine clinic	Neuropsychiatry consult–liaison service	Academic project (neuroethics research project)
Afternoon	Movement disorders clinic	Neuroradiology			
Neurology					
Morning	Neurostimulation	Rehabilitation psychiatry clinic	Brain medicine clinic	Virtual behavioral neurology	Academic project (master teacher program)
Afternoon	Rapid access addiction medicine clinic		Procedural headache clinic	Functional neurological disorder clinic	

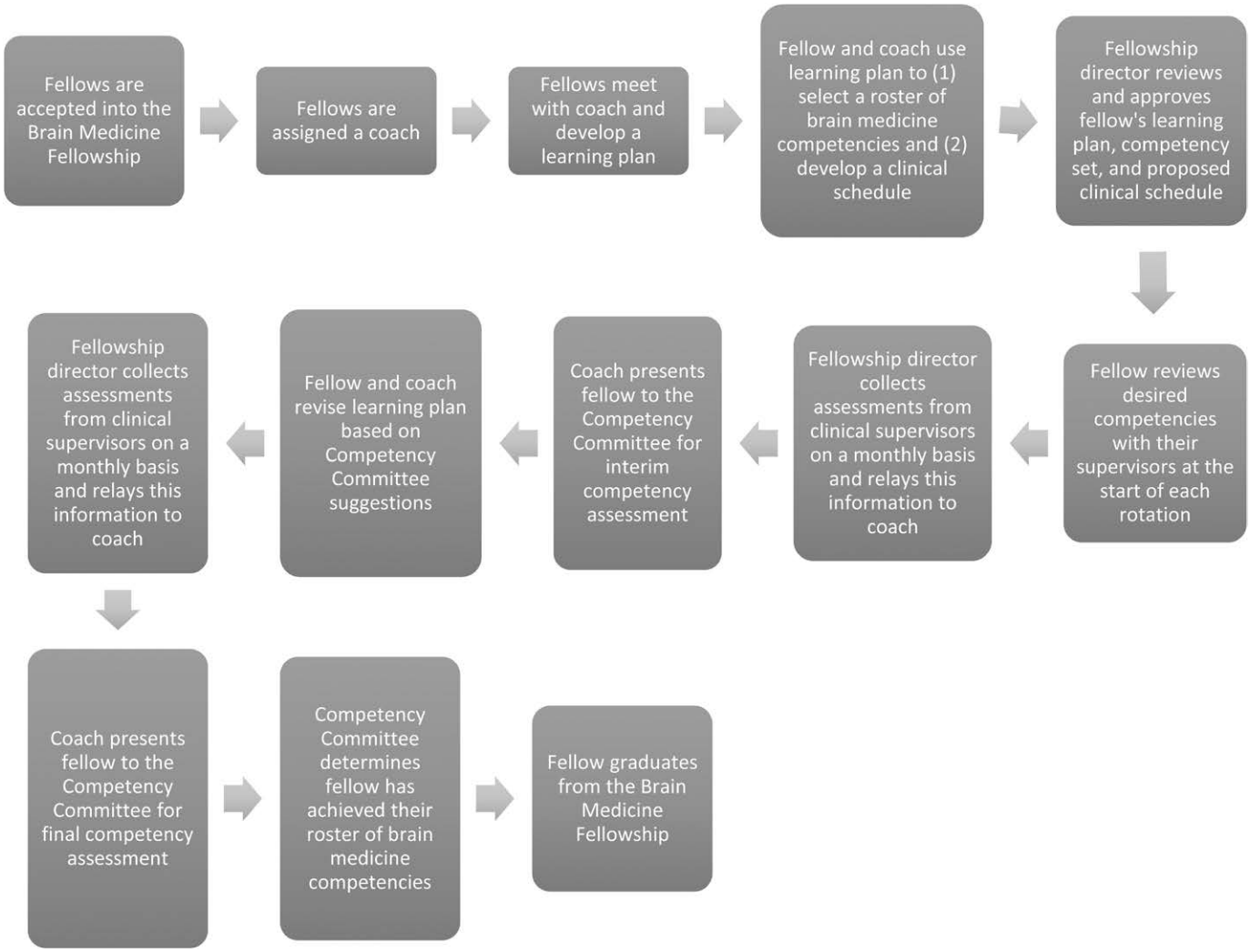

Figure 1 The path of a fellow through the Brain Medicine Fellowship from the time of acceptance to the time of graduation (typically 6–12 months). The program map highlights the roles of fellows, coaches, supervisors, the fellowship director, and the Competency Committee at the University of Toronto Temerty Faculty of Medicine. The application includes self-identified learning objectives.

Outcomes

The first brain medicine fellow was enrolled from July 2019 to December 2020. The fellowship has received national and international interest and has since accepted fellows from psychiatry, neurology, and PM&R residency programs. There is a pattern of high interest in the fellowship; there were 8 candidates for the past 2 application cycles, and we have received multiple requests from learners at the postgraduate level to complete elective time in brain medicine to establish themselves as engaged potential applicants. One to 3 candidates are accepted per year. As of December 2022, 3 fellows have entered the program, with 3 more anticipated to begin in July 2023. There are currently 26 supervisors engaged in offering clinical and research experiences for fellows, spanning all brain medicine specialities, as well as neuroradiology, neuropathology, and neuroethics.

Feedback has been collected through U of T–issued feedback forms (completed at the end of each rotation) and through learners communicating directly with the fellowship's director and associate director. The feedback has been positive; fellows consistently highlight that they are gaining skills from outside their speciality of origin that feels highly relevant to their anticipated practice setting. Both trainees who have completed this fellowship have accepted faculty positions at academic institutions where they promote a brain medicine approach to care. The inaugural brain medicine fellow (S.L.) assumed the role of associate director of the fellowship and is one of the supervisors in the BMC.

The outcomes of the Brain Medicine Fellowship fall into 3 domains: (1) the emergence of a new type of specialist physician, (2) educational innovation, and (3) a novel clinical program. The literature on training clinicians who are comfortable working with complex brain disorders suggests models largely centered on trainees from one discipline spending an increased amount of time visiting another specialty, arguing that increased exposure to different disciplines will help build skills.[9] This pedagogic ethos is in keeping with a multidisciplinary approach, in which different disciplines' knowledge is viewed in a side-by-side fashion.[3,5]

However, multidisciplinary models lack the integration that characterizes an interdisciplinary perspective. In prioritizing interdisciplinarity, the Brain Medicine Fellowship and BMC represent a training program in which previously published recommendations for improving learners' abilities to treat complex brain disorders have both been systematically implemented and expanded on, resulting in the development of a new type of specialist physician.

The concept of a fellowship program that can train a brain medicine specialist has been well received by trainees, faculty, and U of T. This positive reception is exemplified by the large number of candidates applying, by the number of faculty who are eager to supervise brain medicine fellows, and by the financial and administrative support offered by the academic institution. The fellowship and clinical program have also generated philanthropic support, suggesting that patients, their caregivers, and the general public see benefit to fostering this new type of clinician.

The Brain Medicine Fellowship shows innovation in education and is one of the first competency-based fellowships outside of surgical specialties. The CBME framework supports accommodating the unique needs and training background of each fellow in the Brain Medicine Fellowship. It promotes collaboration among different specialists because the pedagogic infrastructure (e.g., competency committee, coaches, supervisor feedback) requires frequent communication among clinical educators. The need for interdisciplinary partnerships in both clinical and educational domains advances a culture of collaboration among brain medicine specialities and fosters future innovation that will benefit patients, practitioners, trainees, and the health care system.

The Brain Medicine Fellowship's emphasis on innovative interdisciplinary competencies helps it overcome a common challenge of CBME: the risk of reducing specialties to their building blocks such that there is a loss of the higher-order capabilities needed in complex clinical contexts.[10] Finding and navigating complexity is an integrated competency in which clinicians can learn to meld patient experience with scientific knowledge of the condition and treatment options.[10] The core clinical experience of the fellowship and the BMC is a novel clinical program borne out of the need to provide trainees with ample opportunities to achieve this competency. Through its original approach to caring for complex brain disorders, the BMC offers learners the opportunity to hone their ability in neurobiopsychosocial formulation.[1] The Brain Medicine Fellowship trains future generations of practitioners to take innovative approaches to the care of patients with complex brain disorders, thereby increasing the capacity of health care systems to care for these patients.

Next Steps

The iterative development of the Brain Medicine Fellowship continues as we learn from the experiences of each fellow cohort. We continue to refine the competencies and are soliciting feedback from the national community of physicians working in brain medicine specialties on our working competency document. Once finalized, these competencies will be translated into entrustable professional activities and constituent milestones. We anticipate that this work will be completed by December 2023 and plan to formalize assessment tools and measures over that same time frame (including securing an electronic assessment platform on which the competencies, entrustable professional activities, and milestones can be tracked for each learner). Feedback on the fellowship as a whole has not yet been collected in a systematic and targeted fashion. A formal programmatic evaluation will be completed by 2025, using tools such as online surveys, focus group interviews, and validated clinical education measures. We will integrate the feedback received through programmatic evaluation into the iterative development of the fellowship.

The Brain Medicine Fellowship is an innovative training program that responds to emerging clinical needs by training a new type of clinician who can holistically manage patients with complex brain disorders. On the basis of the CBME educational model, this fellowship is customized for individual learners and increases opportunities for collaboration among supervisors. The fellowship has already facilitated the creation of a novel clinical setting that targets the needs of patients with complex conditions. We hope that the Brain Medicine Fellowship at U of T can be used nationally and internationally as a template for replication and expansion at other institutions.

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S. Levitt is associate director, Brain Medicine Fellowship, and assistant professor, Department of Psychiatry, University of Toronto, as well as a psychiatrist, Centre for Mental Health, University Health Network, Toronto, Ontario, Canada.

A. Henri-Bhargava is medical director, Neil and Susan Manning Cognitive Health Initiative, clinical associate professor, University of British Columbia, and a neurologist, Royal Jubilee Hospital, Victoria, British Columbia, Canada.

D.B. Hogan is professor of medicine, University of Calgary, and a specialist in geriatric medicine, Health Sciences Centre, Calgary, Alberta, Canada.

K. Shulman is professor, Department of Psychiatry, University of Toronto, and a psychiatrist, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada.

S.B. Mitchell is director, Brain Medicine Fellowship, and assistant professor, Division of Neurology and Department of Psychiatry, University of Toronto, as well as a neurologist, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada.

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