Chapter # 22

REFLECTIONS SHAPED BY THE COVID-19 PANDEMIC FOR MEDICAL EDUCATION IN CHINA, AND GLOBALLY

Liying Wei[1], & Pamela Brett-MacLean[2]
[1]*Associate Professor, Institute of Foreign Languages, Chinese Medical University, Shenyang, Liaoning Province, People's Republic of China*
[2]*Associate Professor, Department of Psychiatry, Faculty of Medicine & Dentistry, University of Alberta, Edmonton, Alberta, Canada*

ABSTRACT
The unprecedented global disruption introduced by the ongoing COVID-19 pandemic has highlighted the need to consider how to best prepare our learners to respond to the wide, interconnected array of global health challenges we face at this historical juncture. In 2019-20, when Professor Wei was a visiting professor at the University of Alberta, we began an East-West dialogue regarding the contributions of the medical/ health humanities to medical education. Following the emergence of the pandemic, we explored a broad literature base as they considered opportunities for reforming medical education to better prepare physicians to address complex global health circumstances and crises. Proposed directions for reorienting medical education include emphasizing systems science and public health competencies, promoting relationally-oriented identity formation and developing humanistic qualities and adaptive leadership ability through both systems-focused, humanities-informed curriculum and pedagogical processes. Ultimately, how successfully our learners respond to ongoing and emergent global health challenges will depend on how well we prepare them for the future. Recognizing increasing worldwide adoption of competency-based medical education, there is a pressing need to explore how to promote, and authentically assess, development of adaptive relational, collectivist competencies and capabilities.

Keywords: international exchange; medical education; medical humanities; public health; leadership; COVID-19.

1. INTRODUCTION

> *"The major problems in the world are the result of the difference between how nature works and the way people think."* (Bateson, 2011)

As a global community, we face multiple, complex health challenges associated with social inequities and economic disparities, changing demographics, and environmental concerns.
The Lancet's 2018 "Countdown" report on climate change describes health risks associated with rising temperatures, declining food security, and infectious disease (Watts et al., 2018). Alongside the opportunities that cross-continent movement of people, knowledge, and technology affords, there is also increased risk of outbreaks of disease (Madhav et al., 2017). Indeed, the novel coronavirus first reported in December 2019 rapidly evolved into the COVID-19 pandemic in 2020. Although projected to be transitioning to an endemic phase (Biancolella et al., 2022), health professional education has been disruptively impacted in various ways over the past several years (Hall et al., 2020; Reyna, 2020), and healthcare vulnerabilities have been laid bare worldwide. In a 2020 *Medical Teacher* editorial published,

Professor Trevor Gibbs asked "has this pandemic really made us think? Are we expressing a knee-jerk reaction to an immediate need or are we creating a new world of healthcare and health professions education?" (p. 738). Set against the backdrop of widespread adoption of competency-based assessment, our East-West discussions during the time we shared together in 2019-20, which have continued on at different points since then, offered us an opportunity to reflect on possibilities for enhancing medical education to help prepare physicians to address the global health challenges we currently face.

The global movement toward competency-based medical education (CBME) (Frank et al., 2010, 2017; ten Cate & Billett, 2014) has impacted educational programs around the world. A highly influential framework, Canada's CanMEDS framework outlines competencies organized into medical expert, communicator, collaborator, leader, health advocate, scholar, and professional roles (Frank, Snell, & Sherbino, 2015). In the United States, the ACGME Framework includes patient care, medical knowledge, interpersonal and communication skills, professionalism, practice-based learning, and systems-based practice competencies (Swing, 2007). Similar frameworks have been introduced in the UK (General Medical Council, 2013), and elsewhere. In China, studies have explored a range of culturally appropriate competencies. For example, Liu, Tian, Chang, Sun, and Zhao (2016) identified administrative management, professionalism, diagnosis and treatment planning, interpersonal communication, disease prevention and health promotion, medical knowledge and lifelong learning, academic research, and teamwork, as important competencies. A qualitative study by Lio, Ye, Reddy, Dong, and Sherer (2016) identified communication and collaboration, professionalism, morality, and ethics, patient care, scholarship, and quality assurance as core competencies. Distinctive aspects of CBME include learner-centredness, focus on clearly articulated knowledge and skill outcomes, ongoing individualized assessment, and sequenced, time-independent progression (Frank et al., 2010). From a social learning and complexity perspective (Bleakley, 2017), CBME may be criticized as being overly reductionist and individual-oriented. Additional challenges include adequacy of assessment (Lurie, 2012; Santen, Ryan, & Coates, 2020), relative inflexibility in responding to skills and knowledge needed for emergent conditions and situations (Hawkins et al., 2015), in addition to other conceptual, psychometric, and logistical concerns (Norman, Norcini, & Bordage, 2014). Despite its limitations with respect to abstract, integrative critical and creative thinking, CBME is popularly considered to be more transparent and accountable than traditional, time-based approaches—many consider the advantages of CBME to outweigh any disadvantages (e.g., Holmboe et al., 2017).

In China, similar to other countries, it is clear many proposed core competencies refer to attributes associated with being a compassionate, effective healer and professional—qualities fostered through humanistic role-models, as well as the medical humanities (also referred to as "health humanities") content and pedagogical approaches (Shapiro, Coulehan, Wear, & Montello, 2009; Jones, Blackie, Garden, & Wear, 2017). Overlapping, interdisciplinary fields, the medical/ health humanities (M/HH) encompass a wide range of health professions, communities, patients, and carers, engaging arts, humanities, and social sciences approaches and perspectives to improve health and healthcare for all. Contributing to high quality medical education, all disciplines included within the M/HH provide insight into the human experience of illness and suffering, responsibilities to self and caring for others, patients, colleagues, and larger society (New York University School of Medicine [NYUSOM], 1993). In China, Guo, Wei, Li, and Li (2016) outline four interrelated components comprising the medical humanities (as cited in Vuillermin, 2016, p. 3):

> The highest level can be literally translated as 'medical humanities spirit' (医学人文精神), which implies the ultimate care for man and the respect for life.
> The next level is translated as 'medical humanities care' (医学人文关怀) —

humane care, meaning beneficence in biomedical research and healthcare. The third level is 'the medical humanities' (医学人文学科) — the interdisciplinary cluster of the humanities and social sciences that scrutinizes medicine from their own perspectives. Lastly, it refers 'medical humanities competence' (医学人文素质) — the ability to take benevolent actions in biomedical research and clinical care.

Together these interrelated components suggest M/HH competency is recognized through caring, context-sensitive, responsiveness to patient, community, and societal needs, as a healer, professional, and scholar. Duan (2017) has also outlined a vision for a 'big' or 'great' health humanities for China linked to Healthy China 2030 (Tan, Liu, & Shao, 2017), which includes concern for the complete health of individuals (physical, mental, and moral), as well as institutions and professionals that care for patients, and need to address social determinants of global health. Duan's vision of an encompassing health humanities offers an opportunity to expand notions of individual competencies (something that an individual has, or not) to encompass more relationally-responsive, adaptive physician competencies.

In this chapter, we describe what we believe are pressing opportunities for helping prepare physicians for the urgent health challenges we face. Contributing to other pandemic preparedness calls to action (e.g., O'Byrne, Gavin, & McNicholas, 2020), we propose the need to develop health systems science and public health competencies. In addition, we also point to opportunities related to "being" and "becoming" a physician, including fostering relationally-oriented identity formation, supporting cultivation of medical humanistic competency, and building adaptive leadership. Our ideas are informed by the report of the independent commission on health professions education co-chaired by Professors Chen (President, China Medical Board) and Frenk (Dean, Harvard School of Public Health) entitled "Health Professionals for a New Century: Transforming education to strengthen health systems in an interdependent world" (Frenk et al., 2010), and the vision for medical leadership development proposed by Mangrulkar et al. (2020). Guo et al.'s (2016) multi-level definition of medical humanities, and Duan's (2017) 'big health humanities', also helped shape our ideas.

2. GIVEN COVID-19, PROPOSED DIRECTIONS FOR REORIENTING MEDICAL EDUCATION

2.1. Develop Collaborative Competencies in Systems Science and Public Health

Overwhelmed hospitals and insufficient supplies of personal protective equipment combined with population movement in January, 2020 around the national Spring Festival (Lunar New Year) led the healthcare system in Wuhan in Hubei Province, China—ground-zero for COVID-19—to near collapse. Chinese government officials introduced a travel ban and 76-day "lockdown" one day before the holiday celebration to contain the spread of the virus and reduce the number of people seeking care. At that time, with hospital wards at capacity, many with COVID-19 symptoms were turned away. Many healthcare workers (HCWs) became infected with the virus—by early February, 1716 HCWs had contracted COVID-19, 63% of whom were at the frontlines in Wuhan (Wu & McGoogan, 2020). The overall multi-faceted public health emergency response, which also included organizational leadership consolidation, dispatch of HCWs from other regions to support emergency response efforts in Wuhan, implementation of other public health measures (infection control, procurement of personal protective supplies, early detection, etc.), and psychological support for frontline HCWs, helped to contain the outbreak (Pan et al., 2020).

As the pandemic progressed over time, it has tested the capacity and resilience of healthcare systems around the world, sounding an alert for expanded curricular content on

pandemic preparedness. Yang et al. (2020) noted "an integrated course on public health emergency response is virtually non-existent" (p. 789) in Chinese medical education. A recent review of global approaches to health crisis preparedness found training efforts in higher income countries tended to focus on "complex emergencies, bioterrorism, and mass casualty incidents" using complex, interactive simulations, while infectious disease was the predominant focus in lower income countries (Robinson et al., 2019; p. 3). Knowledge and perspectives from a wide array of M/HH disciplines along with M/HH pedagogical approaches and processes (e.g., narrative inquiry and reflection, etc.) have offered helpful lessons and insights (Jones, 2020; Van Bavel et al., 2020). However, we believe simple knowledge will be insufficient in helping our learners prepare for healthcare crises. Rather, as argued by psychologist John Shotter (1999, 2016) who based his inquiries into the dialogically-structured nature of human communication on our intrinsic interrelatedness, we believe that developing an expanded orientation to, attunement, and openness to responding to each other as 'relational beings' (e.g., see Casey, Watts, Frost, Kedmy, & Brett-MacLean, 2020), rather than 'thinking machines', will help create the social conditions needed to help us meet the challenges we face.

von Bertalanffy's (1969) systems theory, or "general science of 'wholeness'" (p. 37), which led to Engel's (1977) biopsychosocial model and subsequent diverse applications of systems and complexity science in medical education (Bleakley, 2010; Cristancho, Field, & Lingard, 2019; D'Eon, 2017; Sturmberg, & Martin, 2009), may help us in this regard. In response to Frenk et al.'s (2010) call for a "redesign of professional health education" (p. 1923) to better meet the healthcare needs of patients and communities in our deeply interconnected world, Lucey (2013) argued for a shift from graduating a "siloed" expert physician to developing a "collaboratively effective systems physician" (p. 1640) who work interdependently with others in providing and improving care, and introduction of immersive, experiential, team-based learning to support development of collaborative competencies directed to improvement of complex health systems. Lingard (2016) has further argued that we need to move beyond the individualistic orientation framing much of medical education in the West, and develop educational practices to support the development of "collective competence", described as the "distributed capacity of a system, an evolving, relational phenomenon that emerges from the resources and constraints of particular contexts" (p. S19). With respect to global health education, Eichbaum (2015, 2017) suggests the need to reconceptualize competencies as inclusive of both individualist and collectivist learning.

Effort will be needed to shift to health systems science and collectivist public health competencies. Gonzalo, Davis, Thompson, and Haidet (2020) described "mixed receptivity" (p. 250) in relation to engagement of medical students introduced to a new curriculum component focused on health systems science, attributing this to medical students viewing such learning as "peripheral to their future practice and not aligned with a professional identity that places emphasis on basic and clinical science topics" (p. 250). Nevertheless, given the COVID-19 pandemic, we are hopeful that recognition of the importance of health systems science and public health will lead to integration of these areas in health professions education and healthcare systems.

2.2. Shift to Relationally-oriented Identity Formation

HCWs across the world have been steadfast in their care of patients throughout the pandemic. From the beginning, they have stood firm in their resolve to provide the best patient care possible despite shortages of hospital beds, staff, medicine, and protective equipment.
Early on, many worked long shifts without drinking, eating, or going to the bathroom, to avoid replacing their protective gear while medical research groups frantically worked to

produce a vaccine to counter the virus, resulting in the development of an effective vaccine that was field-tested within about a year of the start of the pandemic, surprising many (Biancolella et al., 2022). In Wuhan and other regions of China, HCWs remained at the frontlines caring for patients, even as the situation grew increasingly worse. When they could no longer keep sleep at bay, they napped on a chair or the floor. Even with an ever-increasing number of cases, sorely in need of comfort and rest themselves, they provided comfort to patients in place of family members who were not allowed to enter the hospital. They were often the last person a COVID-19 patient saw before they died. Recognizing the extraordinary response of frontline HCWs, Shi and Jiao (2020) have described the COVID-19 pandemic as "a live class on medical professionalism" (p. 677).

Professionalism, the basis of medicine's contract with society, demands placing the needs and interests of patients above the physician. Endorsed worldwide, the Medical Professionalism Project's 2002 Charter of Medical Professionalism in the New Millennium ("the Charter") details values and commitments directed to guiding the daily work of physicians. In addition to an encompassing set of responsibilities, including "commitment to professional competence" (p. 520), medical professionalism is founded on three principles: social justice, patient autonomy, and primacy of patient welfare. In 2011 an adapted version of the Charter was introduced in China (Jin, 2015). The Chinese Medical Doctor Declaration ("the Declaration") establishes a commitment to universal professionalism aligned with Confucian and other Chinese cultural traditions. It includes six tenets: equality and benevolence, primacy of patients, honesty and fidelity to promises, commitment to excellence and prudence, incorruptibility and impartiality, and lifelong learning. Both in the Charter and Declaration, medical professionalism is described in rule-based, abstract terms. Although well-intended, such an approach is somewhat lacking as a means for influencing beliefs, values, and conduct. Dilnot (2017), a design theorist, argues that caring "as an ideal, an aspiration, a principle (is) without *operative purchase* … (such concepts are) 'indistinct' … they do not contain within itself the operative criteria by which it can become manifest" (p. 1) (emphasis added). Bleakley, Marshall, and Brömer (2006) similarly observed: "Learners may learn *about* something (propositional knowledge) but never really *inhabit* the learning or activity in which that learning is embedded (practical knowledge)" (p. 200). Abstract, rule-based professionalism can lead to pretending to understand, or passively, in limited ways, enacting professionalism commitments. Understanding of abstract concepts develops through encounters and interactions with material artifacts and/or other individuals (patients, learners, mentors, etc.). As a response to this, at least in the West, professional identity formation (PIF), or process of becoming or "being" a physician, has received increasing attention, in addition to "doing". The 2010 Carnegie Foundation Report proposed PIF should be a major focus for medical education (Irby, Cooke, & O'Brien, 2010), an opinion echoed by many M/HH contributors (e.g., Boudreau & Fuks, 2015; Goldie, 2012; Wald, 2015; Wald et al., 2015).

Traditionally, physician identity has stressed individual accomplishment, responsibility, and accountability. In 1990, Miller proposed a pyramid model of competency evolving from cognitive understanding (knows, knows how), to behavioural competence evidenced in simulated and real-life, clinical settings (shows how, does). Recognizing the foundational importance of "the development of professional values, actions, and aspirations" (p. 181) to medical professionalism, Cruess, Cruess, and Steinert (2016) proposed that 'Is'—an integrated sense of one's moral professional identity (which we would suggest, is ever-developing)—be added to Miller's model. Holden et al. (2015) refer to PIF as a "transformative journey through which one integrates the knowledge, skills, values, and behaviors of a competent, humanistic physician with one's own unique identity and core values" (p. 762), that involves an ongoing process of personal and professional growth that

occurs through "mentorship, self-reflection and experiences that affirm the best practices, traditions, and ethics of the medical profession" (p. 762). In addition to describing qualitatively distinct and discontinuous stages associated with identity formation, Jarvis-Selinger, Pratt, and Regehr (2012) note the integral importance of social contexts, practice environments, and relationships. Involving active, developmental and relational processes (Cruess, Cruess, Boudreau, Snell, & Steinert, 2015; Frost & Regehr, 2013), PIF also recognizes the importance of patient-centred care, teamwork, and interprofessional collaboration. PIF develops through an orientation to being, being present, and embodied responsiveness to others, in the midst of various uniquely evolving situations and circumstances. For medical learners, dynamic processes of engagement support heightened awareness and understanding, while also providing a foundation for exploring and reflecting on their experiences. Work-integrated, interprofessional learning experiences provide opportunities for students to explore and internalize a commitment to medicine and its guiding ideals following a "self-altering" journey (Montgomery, 2006) that leads to "thinking, acting, and feeling" like a physician (p. 186). Ideally, remaining true to themselves, learners attune and respond to emergent possibilities for growth across a wide range of roles, relationships, and professional contexts (see Rutberg et al., 2017).

Along with Bleakley (2017), we believe there is a need to move beyond individualistic, "heroic doctor" identity formation to developing patient-centred, interprofessional team identities, and orientation to population and global health among our learners (Duan, 2017; Eichbaum, Reid, Coly, Naidu, & Omaswa, 2019). A focus on relationally-oriented identity formation throughout the continuum of medical education is needed to pursue best approaches for supporting the development of caring, compassionate physicians who, as "global citizens" (Wu & Noel, 2020) recognize the interrelatedness of our world and need to collaborate with others across systems and countries to address emergent health challenges and improve health both locally and globally.

2.3. Cultivate Medical Humanistic Competency

Viral pandemics exert "extraordinary and sustained demands on public health and health systems and on providers of essential community services" (US Department of Health & Human Services, 2017; p. 42). During the early days of COVID-19, many Chinese frontline HCWs described feeling afraid, lonely, exhausted, depressed, even hopeless (Du et al., 2020). In 2019, the World Health Organization (WHO) recognized chronic, work-related stress leading to burnout (feelings of exhaustion, depersonalization or cynicism, and reduced effectiveness) as an "occupational phenomenon". Described as a global epidemic (*The Lancet*, 2019a), there is growing concern regarding rates of physician burnout around the world. A systematic review identified an overall prevalence of burnout symptoms among Chinese physicians ranging from 66.5% to 87.8% (Lo, Wu, Chan, Chu, & Li, 2018). Song et al. (2015) raised concerns about work overload in response to increasing rates of unexpected, sudden death among Chinese physicians from 2008 to 2015. Zheng et al. (2019) cite a study that found that among Chinese doctors, one-third were found to have experienced conflict with patients, and that there were "high incidence rates of depressive symptoms and suicide attempts" (p. 2). Burnout impacts everyone—physicians, their family members, colleagues, and of course, their patients. Physicians who experience burnout are more prone to medical errors, professionalism lapses, and treating their patients callously in an objectified manner. Recognizing the extreme conditions of a pandemic, how can the health and well-being of HCWs be supported to help ensure their resilience given personal risk of infection, heavy workloads, physical fatigue, emotional stress, isolation, and when resource shortages are experienced, distressing moral dilemmas?

In the West, burnout has traditionally been conceptualized more as an individual, rather than a systems-based problem, although there has been a recent shift toward a more encompassing view (Card, 2018; Montgomery, 2014; *The Lancet*, 2019b). Western strategies for helping reduce physician burnout include individual, physician-directed measures (personal coping and work-life balance, connecting with supportive colleagues to discuss patients and stressors, mindfulness courses, etc.), and organizational-level interventions (reduction of workload, better team functioning, etc.)—benefits are associated with both, although organizational initiatives have been identified as having greater impact (Panagioti et al., 2017). Cultural norms and workplace ethics vary across countries. Although many Chinese physicians may sense they are experiencing overload or burnout, the Chinese work culture of withstanding hardship without complaint likely has contributed to high burnout rates. What can be done? From a Chinese cultural perspective, Lo et al. (2018) suggest a renaissance of medical humanities, and efforts to strengthen the primary healthcare system, as promising directions for addressing the problem of physician burnout in China.

Medical humanistic competency is not a technical skill that can be obtained through attending lectures or passing examinations. It involves an array of processes including reflection and sense-making supported by M/HH, leading to ongoing personal and professional development, as well as job-related gratifications, such as authentic connections with patients and colleagues, and enhanced resiliency supported by realistic, proactive, and positive attitudes and perspectives (Zwack & Schweitzer, 2013). Recognition of the importance of supporting development of humanistic attributes through integration of arts, humanities, and social sciences in medical education has led to global expansion of M/HH (Wei, Goez, Hillier, & Brett-MacLean, 2020). Evidence supports the benefits of active involvement in the arts (visual art, music, literature, theatre, etc.) and humanities in medical school. Mangione et al. (2018) found that exposure to the arts and humanities was correlated with positive qualities such as emotional intelligence, empathy, and observational skills, among medical students, as well as reduced burnout, pointing to the importance of self-care in caring well for others. Embracing arts and humanities offers a means of hope and support for healthcare professionals at any time, but especially so during extremely challenging periods such as a pandemic when other sources of support and sustenance may be disrupted given the need for physical distancing and quarantine. Reading, drawing or making crafts, listening to music, watching films, exploring different culinary creations, all provide a moment of pause or escape from stressful circumstances, offering an open, imaginative space for self-reflection and adjusting to a new normal (see Cénat et al., 2020).

Appreciating resiliency as a dynamic or creative process, M/HH can contribute to medical humanistic competency. Internalized humanistic competency is important not only for the personal well-being of HCWs but also patients' well-being. Chinese physicians shared that during the early months of the pandemic, many patients diagnosed with COVID-19 were particularly struck hard, both physically and mentally. Some refused to eat, drink, talk, or follow prescribed treatment. They felt hopeless to live any more. However, HCWs did not give up on them. They spent time talking with them, and sang songs for them, they danced for them, and shared jokes. Gradually patients began to feel more hopeful and began to cooperate with their treatment plans which helped them to recover. The humanistic care they received helped to improve the health outcomes of patients. Recognizing that frontline HCWs will inevitably experience stress and anxiety through healthcare crises, we can imagine connecting emotionally with patients in different ways is also beneficial to them (Wald, 2020). M/HH can also provide insights and perspectives that can help develop organizational approaches to addressing burnout among HCWs. For example, Adams and Walls (2020) emphasize the importance of transparent and thoughtful communication, and encouraging and supporting self-care as central to promoting organizational trust and a sense of control

among HCWs (also see Wu et al., 2020). We need to proactively create a healthcare culture that supports wellness and resiliency, and can quickly respond to the needs of frontline HCWs, including medical educators and learners during emergent challenging periods.

2.4. Build Adaptive Leadership Ability for a Changing World

Early on many did not take the threat of COVID-19 seriously. Dr. Li Wenliang who warned colleagues about a potential new virus was initially reproached for spreading false rumours. After he died of COVID-19 an official inquiry later found he was a professional leader who had fought bravely and made sacrifices. The contributions of trusted medical leaders such as Professors Zhong Nanshan, Li Lanjuan, and Zhang Wenhong who helped communicate the threat of COVID-19 to the public also needs to be recognized. On January 20, 2020, Zhong, who helped isolate the SARS virus during the SARS epidemic in 2002-2004, announced on state television human-to-human transmission of the virus had been confirmed, making clear the gravity of the situation. Authorities and medical leaders communicated with the public through many channels and encouraged preventive behaviours. Chinese people, from government leaders to the public masses, worked together to reduce the numbers of those infected and control the pandemic. At the age of 83, Professor Zhong, who has argued M/HH education should be directed to ensuring the essential nature of medicine as a healing profession (Li, 2016), went to Wuhan when it was in lockdown during the first wave of the pandemic to help manage and lead the response.

Public health crises like the COVID-19 pandemic create opportunities for leadership across all levels (Van Bavel et al., 2020). In their 2010 report, Frenk et al. emphasize the importance of leadership in ensuring effectiveness of complex healthcare systems globally. Beyond management and governance, an emphasis on leadership competency emphasizes the need to adaptively improve increasingly complex, interconnected healthcare systems to advance patient care, and overall population and global health. There is a need to shift from individual leadership competency to capability development of individuals across organizations and systems that helps prepare everyone to contribute 'knotworking', a term coined by Engeström (2012, 2018) to describe the improvisational, goal-focused activity connections of fluidly emergent, distributed teams (also see Bleakley, 2013). Developing leaders is not just about training, but requires opportunities for personal development and leadership across the learning continuum. Medical universities, hospitals and healthcare clinics offer ideal environments for developing adaptive leadership competencies such as systems thinking, managing complexity, fostering organizational resiliency, and responsive creation of new collaborative practices. In addition, Yang et al. (2020) point to the opportunity for medical education in China to capitalize on double-degree programs such as MD/MPH and MD/MBA degrees "to secure interdisciplinary leadership of the future for challenging times like this" (p. 789; also see Crites, Ebert, & Schuster, 2008). Recognizing the need for transformative education to support the development of leadership attributes needed in the 21st century, Frenk et al. (2010) encouraged shifting from "non-critical adoption of educational models to … (global flows) of pedagogical resources, and innovations" (p. 2). A group of Canadian and US medical students and educators developed a curriculum for advocacy and leadership which they suggest can be adapted and used elsewhere (Benrimoh et al., 2016). Grounded in complexity science, an international group is collaborating on a CBME-based model of leadership development for all physicians (Matlow et al., 2016). Lobdell et al. (2020) encourage adoption of leadership models that prioritize a "team-oriented approach to care delivery and collaboration across institutions" (p. 2) to help catalyze both short- and long-term improvements needed across many interconnected, networked systems currently impacting healthcare around the globe to help

prevent future pandemics, and also promote health and well-being before, during, and after health crises.

To optimize preparedness and effectiveness of responding to future healthcare challenges, Mangrulkar et al. (2020) propose required leadership curriculum for medical students guided by three core principles: 1) leadership is about values and understanding yourself, 2) leadership is about change, and 3) leadership is about teams and accountability to one another. Reconnecting with ideas regarding being, becoming, and relationally-oriented identity formation seems appropriate here. As argued by Hafferty (2016), "fundamental uncertainties … (and) ambiguities that permeate medical practice, require a professional presence that is best grounded in who one is rather than what one does" (p. 55). Research on optimal teaching and assessment methods directed to helping prepare HCWs to lead through healthcare crises, and then later apply their knowledge and experience to ensure healthcare system change and transformation is needed to improve prospects for human health. As medicine becomes more and more interprofessional and team-based, it is crucial to teach future physicians how to work collaboratively with others, and contribute to needed changes and transformation of healthcare systems, instead of just being informed, and formed. Further, given our deeply interconnected world it is important to encourage development of engaged leadership throughout healthcare organizations and systems.

3. SUMMARY AND CONCLUSIONS

The medical students we teach today will become the physicians of tomorrow, informed by all we have taught them, as they develop new understandings, approaches, and hopes for global health guided by a longer connection into the future than we have access to. How successfully they adapt and respond to the complex health challenges we face will depend on how well we will have prepared them. In this chapter, we have proposed a number of curricular emphases we believe will help prepare our learners to respond to complex, changing global circumstances. We have proposed promotion of relationally-oriented identity formation that includes preparing our learners to be "global citizens". Last century's idealized vision of physicians was the individual superstar, or heroic expert, who focused on biomedical knowledge and technical skills. Lucey (2013) imagined a "collaboratively effective systems physician" identity for the 21st century (p. 1640). Given COVID-19, we propose amending this to a 'collaboratively effective, relationally- and globally-oriented systems physician' identity. We need physicians who are self-, other- and globally-aware, who are caring and committed, creatively adaptive collaborators who inspire teams of all kinds to improve the health of patients, global populations, and the world. Recognizing that people from all walks of life have contributed to the containment of multiple waves of COVID-19 in China and elsewhere, from the beginning of the pandemic through to the present day, we should ensure our communities are also engaged in these collaborative efforts.

Among others, Frenk et al. (2010) have encouraged international competency-based learning efforts, emphasizing the need for transformative learning, and timely development and introduction of curricula to respond to rapidly changing local and societal needs. We believe the curricular emphases we have proposed are aligned with the learner-centred focus of CBME—ideally, students are supported in exploring a range of active, self-directed learning paths (Frost & Regehr, 2013). However, while CBME is effective in assessing technical skills, it is challenging to translate these more complex, adaptive competencies into measurable, behaviourally-based anchors. As noted by Cruess et al. (2016), assessment becomes increasingly difficult at higher levels of Miller's pyramid, with "Is" being most challenging. Given this, they recommend assessment of identity formation be primarily

formative. With respect to M/HH that aims to introduce nuanced perspectives to help learners "query their own attitudes and behaviors" (p. 192), and develop new responsive understanding and insights, Shapiro et al. (2009) caution that M/HH teaching and learning cannot be assessed by applying checklists and algorithms used to evaluate more technical competencies. With respect to adaptive leadership, health systems, and complexity science, Woodruff (2019) recommends "assessing adaptive competence separate from technical competence" (p. 867) noting this would help "avoid incentivizing rigid maladaptive behaviors when more flexible and responsive approaches are in order", and would offer more meaningful directions for ongoing mentorship. Recognizing that narrow, behavioral competency measures can serve to limit or frustrate more fully integrated assessment of progress, Ginsburg, McIlroy, Oulanova, Eva, K., and Regehr (2010) argue "holistic impressions should not be considered invalid simply because they are subjective. Instead, assessment methods should consider novel ways of accommodating these impressions to improve evaluation" (p. 780).

What to do? There is a need for research on systems/complexity-focused approaches to preparing learners to effectively respond to the myriad global health challenges we face. Given widespread adoption of CBME, a pressing question that also needs to be explored is how to best assess adaptive relational, collectivist competencies and capabilities. To bridge the gap between the theory and practice of CBME, and potential overemphasis of measurable technical skills, entrustable professional activities (EPAs) have been proposed as a complement to CBME, offering a more comprehensive approach to assessing complex competencies (ten Cate, 2005, 2013; Englander et al., 2017). Recognizing an increasing emphasis on interprofessional, team-based practice and broader practice contexts, the ICBME Collaborators have identified a need for research that contributes to understanding, enhancement, and assessment of "collective competencies" (Gruppen et al., 2017). Hodges (2013) has argued for inclusion of subjective and collective approaches to assessment methods. Whitehead, Kuper, Hodges, and Ellaway (2015) have proposed the use of social science-based approaches, such as realist and ethnographic methods, to assess socially and culturally-referenced physician competencies. It is expected that over time, increasing effort will be focused on this area. Schuwirth and van der Vleuten (2020) report that exercises that have considered future scenarios in which "healthcare providers are increasingly technology supported and or even technology substituted" suggest that health professionals will need to have "different skills, abilities and competencies, most likely in the humanistic domain" (p. 1053).

In the midst, and wake, of the COVID-19 pandemic there is much we need to learn. We need to do so to best guide and support our learners through their journey to becoming and being humane and effective practitioners and global collaborators, facing a future we can only begin to imagine. We have written this article to contribute to a beginning conversation, recognizing that while complexity and systems approaches may expand possibilities for medical education, these will also undoubtedly introduce limits through what is hidden from view (see Vogt, Ulvestad, Eriksen, & Getz, 2014). Observing the "epistemological narrowing" introduced by biomedical thinking, Squier (2007) has argued M/HH can help remedy resulting medical *nescience*, or "lack of knowledge or awareness" (p. 334) that serves to impede healing, by recognizing complexity and possibilities beyond positivist, biomedical understanding. We characterize this as the 'ontological thrust' of the M/HH, occurring through recognition of dynamic socio-cultural realities, perspective framing, reflexive criticality, catalyzed meaning-making, and other dimensions of human experience, leading to new perceptions and understandings, and ongoing questioning. We believe that innovative, imaginative approaches to learning and assessment directed to fostering integration of our learners' personal and professional growth, medical knowledge, clinical skills, health

systems understanding, and medical humanistic competency will help them courageously navigate their way, led by both their hearts and minds, committed to improving the health of patients and our communities in support of a better future for the world.

REFERENCES

Adams, J. G., & Walls, R. M. (2020). Supporting the health care workforce during the COVID-19 global epidemic. *Journal of the American Medical Association, 323*(15), 1439-1440. https://doi.org/10.1001/jama.2020.3972

Bateson, N. (Director/Producer). (2011). *An ecology of mind: A daughter's portrait of Gregory Bateson* [Motion Picture]. The Impact Media Group.

Benrimoh, D., Warsi, N., Hodgson, E., Demko, N., Chen, B. Y., Habte, R., Dandurand-Bolduc, C., Silverberg, S., Xia, S., Chu, L., & Ruiz-Casares, M. (2016). An advocacy and leadership curriculum to train socially responsible medical learners. *MedEdPublish. 5*, 62. http://doi.org/10.15694/mep.2016.000062

Biancolella, M., Colona, V. L., Mehrian-Shai, R., Watt, J. L., Luzzatto, L., Novelli, G., & Reichardt, J. K. V. (2022). COVID-19 2022 update: transition of the pandemic to the endemic phase. *Human Genomics*, *16*(1), 19. https://doi.org/10.1186/s40246-022-00392-1

Bleakley, A. (2010). Blunting Occam's razor: Aligning medical education with studies of complexity. *Journal of Evaluation in Clinical Practice, 16*(4)*,* 849-855. https://doi.org/10.1111/j.1365-2753.2010.01498.x

Bleakley, A. (2013). Working in "teams" in an era of "liquid" healthcare: What is the use of theory? *Journal of Interprofessional Care, 27*(1)*,* 18-26. https://doi.org/10.3109/13561820.2012.699479

Bleakley, A. (2017). The perils and rewards of critical consciousness raising in medical education. *Academic Medicine: Journal of the Association of American Medical Colleges, 92*(3)*,* 289-291. https://doi.org/10.1097/ACM.0000000000001426

Bleakley, A., Marshall, R., & Brömer, R. (2006). Toward an aesthetic medicine: Developing a core medical humanities undergraduate curriculum. *Journal of Medical Humanities*, *27*(4), 197-213. https://doi.org/10.1007/s10912-006-9018-5

Boudreau, J. D., & Fuks, A. (2015). The humanities in medical education: Ways of knowing, doing and being. *Journal of Medical Humanities*, *36*(4)*,* 321-336. https://doi.org/10.1007/s10912-014-9285-5

Card, A. J. (2018). Physician burnout: Resilience training is only part of the solution. *Annals of Family Medicine, 16*(3), 267-270. https://doi.org/10.1370/afm.2223

Casey, S., Watts, A., Frost, M., Kedmy, A., & Brett-MacLean, P. (2020). Building dialogues between medical students and autistic patients: Reflections on the MD Program's Patient Immersion Experience. *Spectrum, 5*. https://doi.org/10.29173/spectrum83

Cénat, J. M., Noorishad, P. G., Blais-Rochette, C., Mclntee, S. E, Mukunzi, J. N., Darius, W.P., Broussard, C., Morse, C., Ukwu, G., Auguste, E., & Menelas, K. (2020). Together for hope and resilience:
A humanistic experience by the Vulnerability, Trauma, Resilience and Culture Lab Members during the COVID-19 pandemic. *Journal of Loss & Trauma, 25*(8), 643-648. https://doi.org/10.1080/15325024.2020.1774704

Cristancho, S., Field, E., & Lingard, L. (2019). What is the state of complexity science in medical education research? *Medical Education, 53*(1)*,* 95-104. https://doi.org/10.1111/medu.13651

Crites, G. E., Ebert, J. R., & Schuster, R. J. (2008). Beyond the dual degree: Development of a five-year program in leadership for medical undergraduates. *Academic Medicine: Journal of the Association of American Medical Colleges, 83*(1)*,* 52-58. https://doi.org/10.1097/acm.0b013e31815c63b6

Cruess, R. L., Cruess, S. R., Boudreau, J. D., Snell, L., & Steinert, Y. (2015). A schematic representation of the professional identity formation and socialization of medical students and residents: A guide for medical educators. *Academic Medicine: Journal of the Association of American Medical Colleges, 90*(6)*,* 718-725. https://doi.org/10.1097/acm.0000000000000700

Cruess, R.L., Cruess, S.R., & Steinert, Y. (2016). Amending Miller's pyramid to include professional identity formation. *Academic Medicine: Journal of the Association of American Medical Colleges, 91*(2), 180-185. https://doi.org/10.1097/ACM.0000000000000913

D'Eon, M. (2017). Systems thinking and structural competence in and for medical education. *Canadian Medical Education Journal, 8*(1), e1-e5. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5344060/

Dilnot, C. (2017). 'Care' as a problem: How to begin to create, for design, an adequate theory of model of care. In P. Rodgers, C. Bremner, G. Innella, & I. Coxon (Eds.), *Proceedings of "Does Design Care? An International Workshop of Design Thought and Action* (pp. 1-6). Lancaster University: Lancashire, UK. Retrieved from: https://doi.org/10.13140/RG.2.2.24043.64805

Du, J., Dong, L., Wang, T., Yuan, C., Fu, R., Zhang, L., Liu, B., Zhang, M., Yin, Y., Qin, J. W., Bouey, J., Zhao, M., & Li, X. (2020). Psychological symptoms among frontline healthcare workers during COVID-19 outbreak in Wuhan. *General Hospital Psychiatry, 67*, 144-145. https://doi.org/10.1016/j.genhosppsych.2020.03.011

Duan, Z. G. (2017). 大健康人文：医学人文与健康人文的未来 [Great health humanities: The future of medical humanities and health humanities]. *Medicine and Philosophy, 38*(6A), 6-9. (In Chinese) Retrieved from: https://yizhe.dmu.edu.cn/article/id/6412e677fa89b2af1f8754d9

Eichbaum, Q. (2015). The problem with competencies in global health education. *Academic Medicine: Journal of the Association of American Medical Colleges, 90*(4), 414-417. https://doi.org/10.1097/ACM.0000000000000665

Eichbaum, Q. (2017). Acquired and participatory competencies in health professions education: Definition and assessment in global health. *Academic Medicine: Journal of the Association of American Medical Colleges, 92*(4), 468-474. https://doi.org/10.1097/ACM.0000000000001382

Eichbaum, Q., Reid, S., Coly, A., Naidu, T., & Omaswa F. (2019). Conceptualizing medical humanities programs in low-resource settings in Africa. *Academic Medicine: Journal of the Association of American Medical Colleges, 94*(8), 1108-1114. https://doi.org/10.1097/ACM.0000000000002789

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*(4286), 129-136. https://doi.org/10.1126/science.847460

Englander, R., Frank, J. R., Carraccio, C., Sherbino, J., Ross, S., Snell, L., & ICBME Collaborators (2017). Toward a shared language for competency-based medical education. *Medical Teacher, 39*(6),
582-587. https://doi.org/10.1080/0142159X.2017.1315066

Engeström, Y. (2012). *From teams to knots: Activity-theoretical studies of learning at work.* Cambridge, UK: Cambridge University Press. https://doi.org/10.1017/CBO9780511619847

Engeström, Y. (2018). *Expertise in transition: Expansive learning in medical work.* Cambridge, UK: Cambridge University Press. https://doi.org/10.1017/9781139023009

Frank, J. R., Snell, L. S., ten Cate, O., Holmboe, E. S, Carraccio C., Swing, S.R., Harris, P., Glasgow, N. J., Campbell, C., Dath, D., Harden, R. M., Iobst, W., Long, D. M., Mungroo, R., Richardson, D., Sherbino, J., Silver, I., Taber, S., Talbot, M., & Harris, K. A. (2010). Competency-based medical education: Theory to practice. *Medical Teacher, 32*(8), 638-645. https://doi.org/10.3109/0142159X.2010.501190

Frank, J. R., Snell, L. S., Englander, R., Holmboe, E. S., & ICBME Collaborators. (2017). Implementing competency-based medical education: Moving forward. *Medical Teacher, 39*(6), 568-573. https://doi.org/10.1080/0142159X.2017.1315069

Frank, J. R., Snell, L. S., & Sherbino, J. (Eds). (2015). *CanMEDS 2015 Physician Competency Framework.* Ottawa, ON (Canada): Royal College of Physicians & Surgeons of Canada: http://canmeds.royalcollege.ca/uploads/en/framework/CanMEDS%202015%20Framework_EN_Reduced.pdf

Frenk, J., Chen, L., Bhutta, Z. A., Cohen, J., Crisp, N., Evans, T., Fineberg, H., Garcia, P., Ke, Y., Kelley, P., Kistnasamy, B., Meleis, A., Naylor, D., Pablos-Mendez, A., Reddy, S., Scrimshaw, S., Sepulveda, J., Serwadda, D., & Zurayk, H. (2010). Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. *The Lancet, 376*(9756), 1923-1958. https://doi.org/10.1016/S0140-6736(10)61854-5

Frost, H. D., & Regehr, G. (2013). "I am a doctor": Negotiating the discourses of standardization and diversity in professional identity construction. *Academic Medicine: Journal of the Association of American Medical Colleges, 88*(10), 1570-1577. https://doi.org/10.1097/ACM.0b013e3182a34b05

General Medical Council. (2013). *Good medical practice*. Manchester, UK: General Medical Council. https://www.gmc-uk.org/guidance/good_medical_practice.asp

Gibbs, T. (2020). The Covid-19 pandemic: Provoking thought and encouraging change. *Medical Teacher, 42*(7), 738-740. https://doi.org/10.1080/0142159X.2020.1775967

Ginsburg, S., McIlroy, J., Oulanova, O., Eva, K., & Regehr, G. (2010). Toward authentic clinical evaluation: Pitfalls in the pursuit of competency. *Academic Medicine: Journal of the Association of American Medical Colleges, 85*(5), 780-786. https://doi.org/10.1097/ACM.0b013e3181d73fb6

Goldie, J. (2012). The formation of professional identity in medical students: Considerations for educators. *Medical Teacher, 34*(9), e641-e648. https://doi.org/10.3109/0142159X.2012.687476

Gonzalo, J. D., Davis, C., Thompson, B. M., & Haidet, P. (2020). Unpacking medical students' mixed engagement in health systems science education. *Teaching & Learning in Medicine. 32*(3), 250-258. https://doi.org/10.1080/10401334.2019.1704765

Gruppen, L., Frank, J. R., Lockyer, J., Ross, S., Bould, M. D., Harris, P., Bhanji, F., Hodges, B. D., Snell, L., ten Cate, O., & ICBME Collaborators. (2017). Toward a research agenda for competency-based medical education. *Medical Teacher, 39*(6), 623-630. https://doi.org/10.1080/0142159X.2017.1315065

Guo, L., Wei, L., Li, Y., & Li, H. (2016). Medical humanities and empathy: An experimental study. In D. Vuillermin & L. Guo (Eds.), *Chinese medical humanities review* (pp. 29-35). Beijing, China: Peking University Medical Press. https://www.purpleculture.net/chinese-medical-humanities-review-2016-p-25198/

Hafferty, F. W. (2016). Professionalism and the socialization of medical students. In R. L. Cruess, S. R. Cruess & Y. Steinert (Eds.), *Teaching medical professionalism* (2nd ed., pp. 53-73). New York, NY: Cambridge University Press. https://doi.org/10.1017/CBO9781316178485

Hall, A. K., Nousiainen, M. T., Campisi, P., Dagnone, J. D., Frank, J. R., Kroeker, K. I., Brzezina, S., Purdy, E., & Oswald, A. (2020). Training disrupted: Practical tips for supporting competency-based medical education during the COVID-19 pandemic. *Medical Teacher, 42*(7), 756-761. https://doi.org/10.1080/0142159X.2020.1766669

Hawkins, R. E., Welcher, C. M., Holmboe, E. S., Kirk, L. M., Norcini, J. J., Simons, K. B., & Skochelak, S. E. (2015). Implementation of competency-based medical education: Are we addressing the concerns and challenges? *Medical Education, 49*(11), 1086-1102. https://doi.org/10.1111/medu.12831

Hodges, B. (2013). Assessment in the post-psychometric era: Learning to love the subjective and collective. *Medical Teacher, 35*(7), 564-568. https://doi.org/10.3109/0142159X.2013.789134

Holden, M. D., Buck, E., Luk, J., Ambriz, F., Boisaubin, E. V., Clark, M. A., Mihalic, A. P., Sadler J. Z., Sapphire, K. J., Spike, J. P., Vince, A., & Dalrymple, J. L. (2015). Professional identity formation: Creating a longitudinal framework through TIME (transformation in medical education). *Academic Medicine: Journal of the Association of American Medical Colleges, 90*, 761-767. https://doi.org/10.1097/ACM.0000000000000719

Holmboe, E. S., Sherbino, J., Englander, R., Snell, L., Frank, J. R., & ICBME Collaborators. (2017). A call to action: The controversy of and rationale for competency-based medical education. *Medical Teacher, 39*(6), 574-581. https://doi.org/10.1080/0142159X.2017.1315067

Irby, D. M., Cooke, M., & O'Brien, B. C. (2010). Calls for reform of medical education by the Carnegie Foundation for the Advancement of Teaching: 1910 and 2010. *Academic Medicine: Journal of the Association of American Medical Colleges, 85*(2), 220-227. https://doi.org/10.1097/ACM.0b013e3181c88449

Jarvis-Selinger, S., Pratt, D. D., & Regehr, G. (2012). Competency is not enough: Integrating identity formation into the medical education discourse. *Academic Medicine: Journal of the Association of American Medical Colleges, 87*(9), 1185-1190. https://doi.org/10.1097/ACM.0b013e3182604968

Jin, P. (2015). The physician charter on medical professionalism from the Chinese perspective: A comparative analysis. *Journal of Medical Ethics*, *41*(7)*,* 511-514. https://doi.org/10.1136/medethics-2014-102318

Jones, D. S. (2020). History in a crisis—lessons for Covid-19. *New England Journal of Medicine, 382*(18), 1681-1683. https://doi.org/10.1056/NEJMp2004361

Jones, T., Blackie, M., Garden, R., & Wear, D. (2017). The almost right word: The move from medical to health humanities. *Academic Medicine: Journal of the Association of American Medical Colleges, 92*(7), 932-935. https://doi.org/10.1097/ACM.0000000000001518

Li, E. (2016). From medical humanities to humanistic medicine: An interview with academician Zhong Nanshan. *Chinese Medical Ethics, 3,* 369-371. (In Chinese) Retrieved from: https://www.fx361.com/page/2016/1116/16577256.shtml

Lingard, L. (2016). Paradoxical truths and persistent myths: Reframing the team competence conversation. *Journal of Continuing Education in the Health Professions, 36*(Supp 1.)*,* S19-S21. https://doi.org/10.1097/CEH.0000000000000078

Lio, J., Ye, Y., Reddy, S., Dong, H., & Sherer, R. (2016). Developing a competency framework for medical education in China: A qualitative study. *Medical Science Educator, 26,* 743-748. https://doi.org/10.1007/s40670-016-0287-y

Liu, Z., Tian, L., Chang, Q., Sun, B., & Zhao, Y. H. (2016). A competency model for clinical physicians in China: A cross-sectional survey. *PLoS One, 11*(12)*,* e0166252. https://doi.org/10.1371/journal.pone.0166252

Lo, D., Wu, F., Chan, M., Chu, R., & Li, D. (2018). A systematic review of burnout among doctors in China: A cultural perspective. *Asia Pacific Family Medicine, 17*(1), 1-13. https://doi.org/10.1186/s12930-018-0040-3

Lobdell, K. W., Hariharan, S., Smith, W., Rose, G. A., Ferguson, B., & Fussell, C. (2020). Improving health care leadership in the Covid-19 era. *NEJM Catalyst: Innovations in Care Delivery.* https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0225

Lucey, C. R. (2013). Medical education: Part of the problem and part of the solution. *JAMA Internal Medicine, 173*(17)*,* 1639-1643. https://doi.org/10.1001/jamainternmed.2013.9074

Lurie, S. J. (2012). History and practice of competency-based assessment. *Medical Education, 46*(1)*,* 49-57. https://doi.org/10.1111/j.1365-2923.2011.04142.x

Madhav, N., Oppenheim, B., Gallivan, M., Mulembakani, P., Rubin, E., & Wolfe, N. (2017). Pandemics: Risks, impacts, and mitigation. In D. T. Jamison, H. Gelband, S. Horton, P. Jha & R. Laxminarayan (Eds.), *Disease control priorities: Improving health and reducing poverty* (3rd ed.), pp. 315-345. Washington, DC: The International Bank for Reconstruction and Development. Retrieved from: https://doi.org/10.1596/978-1-4648-0527-1_ch17

Mangione, S., Chakraborti, C., Staltari, G., Harrison, R., Tunkel, A. R., Liou, K. T., Cerceo, E., Voeller, M., Bedwell, W. L., Fletcher, K., & Kahn, M. J. (2018). Medical students' exposure to the humanities correlates with positive personal qualities and reduced burnout: A multi-institutional US survey. *Journal of General Internal Medicine, 33*(5)*,* 628–634. https://doi.org/10.1007/s11606-017-4275-8

Mangrulkar, R. S., Tsai, A., Cox, S. M., Halaas, G. W., Nelson, E. A., Nesse, R. E., Silvestri, R. C., Radabaugh, C. L., Skochelak, S., Beck Dallaghan, G. L., & Steiner, B. (2020). A proposed shared vision for leadership development for all medical students: A call from a coalition of diverse medical schools. *Teaching & Learning in Medicine, 32*(5), 561-568. https://doi.org/10.1080/10401334.2020.1754835

Matlow, A., Chan, M. K., Bohnen, J. D., Blumenthal, D. M., Sanchez-Mendiola, M., de Camps Meschino, D., Samson, L. M., & Busari, J. (2016). Collaborating internationally on physician leadership education: First steps. *Leadership Health Services, 29*(3)*,* 220-230. https://doi.org/10.1108/LHS-12-2015-0049.

Medical Professionalism Project. (2002). Medical professionalism in the new millennium: A physicians' charter. *The Lancet, 359*(9305)*,* 520-522. https://doi.org/10.1016/S0140-6736(02)07684-5

Miller, G. E. (1990). The assessment of clinical skills/competence/performance. *Academic Medicine: Journal of the Association of American Medical Colleges, 65*(9), S63-S67. https://doi.org/10.1097/00001888-199009000-00045

Montgomery, A. (2014). The inevitability of physician burnout: Implications for interventions. *Burnout Research, 1*(1)*,* 50-56. https://doi.org/10.1016/j.burn.2014.04.002

Montgomery, K. (2006). *How doctors think: Clinical judgment and the practice of medicine.* New York, NY: Oxford University Press.

New York University School of Medicine (NYUSOM). (1993). *Literature, arts and medicine (Litmed) database*. http://medhum.med.nyu.edu/about

Norman, G., Norcini, J., & Bordage, G. (2014). Competency-based education: Milestones or millstones? *Journal of Graduate Medical Education, 6*(1), 1-6. https://doi.org/10.4300/JGME-D-13-00445.1

O'Byrne, L., Gavin, B., & McNicholas, F. (2020). Medical students and COVID-19: The need for pandemic preparedness. *Journal of Medical Ethics, 46*(9)*,* 623-626. https://doi.org/10.1136/medethics-2020-106353

Pan, A., Liu, L., Wang, C., Guo, H., Hao, X., Wang, Q., Huang, J., He, N., Yu, H., Lin, X., Wei, S., & Wu, T. (2020). Association of public health interventions with the epidemiology of the COVID-19 outbreak in Wuhan, China. *Journal of the American Medical Association, 323*(19), 1915-1923. https://doi.org/10.1001/jama.2020.6130

Panagioti, M., Panagopoulou, E., Bower, P., Lewith, G., Kontopantelis, E., Chew-Graham, C., Dawson S., van Marwijk, H., Geraghty, K., & Esmail, A. (2017). Controlled interventions to reduce burnout in physicians: A systematic review and meta-analysis. *JAMA Internal Medicine, 177*(2)*,* 195-205. https://doi.org/10.1001/jamainternmed.2016.7674

Reyna, J. (2020). Twelve tips for COVID-19 friendly learning design in medical education. *MedEdPublish, 9*, 103. https://doi.org/10.15694/mep.2020.000103.1

Robinson, C., Goldsmith, A., Merkt, P., Edmier, A., Stanford, K., Hellman, N., & Spiegel, P. (2019). *Training for infectious disease outbreaks and other emergencies in low and middle income country settings: A systematic literature review*. Baltimore, MD: Center for Humanitarian Health, Johns Hopkins Bloomberg School of Public Health. Retrieved from: http://hopkinshumanitarianhealth.org/assets/documents/RRTLit_Review_Final_Draft_6.25.19.pdf

Rutberg, P. C., King, B., Gaufberg, E., Brett-MacLean, P., Dinardo, P., & Frankel, R. M. (2017). Do medical students' narrative representations of "The Good Doctor" change over time? Comparing humanism essays from a national contest in 1999 and 2013. *Academic Medicine: Journal of the Association of American Medical Colleges, 92*(4)*,* 537-543. https://doi.org/10.1097/ACM.0000000000001531

Santen, S. A, Ryan, M. S, & Coates, W. C. (2020). What can a pandemic teach us about competency-based medical education? *AEM Education & Training: A Global Journal of Emergency Care, 4*(3), 301-305. https://doi.org/10.1002/aet2.10473

Schuwirth, L. W., & van der Vleuten, C. P. (2020). A history of assessment in medical education. *Advances in Health Sciences Education*, *25*(5), 1045-1056. https://doi.org/10.1007/s10459-020-10003-0

Shapiro, J., Coulehan, J., Wear, D., & Montello, M. (2009). Medical humanities and their discontents: Definitions, critiques, and implications. *Academic Medicine: Journal of the Association of American Medical Colleges, 84*(2)*,* 192-198. https://doi.org/10.1097/ACM.0b013e3181938bca.

Shi, W., & Jiao, Y. (2020). The COVID-19 pandemic: A live class on medical professionalism. *QJM: An International Journal of Medicine, 114*(9), 677-678. https://doi.org/10.1093/qjmed/hcaa157

Shotter, J. (1999, September). *At the boundaries of being: Re-figuring intellectual life*. Paper presented at the Social Construction and Relational Practices Conference, University of New Hampshire, Durham, NH. Retrieved from: https://www.researchgate.net/profile/John_Shotter2/publication/261250839_Shotter_Boundaries_of_being_UNH_1999/links/569b857908aeeea985a55fdf/Shotter-Boundaries-of-being-UNH-1999.pdf

Shotter, J. (2016). *Speaking, actually: Towards a new "fluid" common-sense understanding of relational becomings*. Farnhill, UK: Everything is Connected Press. https://eicpress.com/speakact.htm

Song, X. N., Shen, J., Ling, W., Ling, H. B., Huang, Y. M., Zhu, M. H., Yang, K. K., Wang, M., & Zhao, H. L. (2015). Sudden deaths among Chinese physicians. *Chinese Medical Journal, 128*(23), 3251-3253. https://doi.org/10.4103/0366-6999.170263

Squier, S. M. (2007). Beyond nescience: The intersectional insights of health humanities. *Perspectives in Biology & Medicine, 50*(3), 334-347. https://doi.org/10.1353/pbm.2007.0039

Sturmberg, J. P., & Martin, C. M. (2009). Complexity and health–yesterday's traditions, tomorrow's future. *Journal of Evaluation in Clinical Practice, 15*(3), 543-548. https://doi.org/10.1111/j.1365-2753.2009.01163.x

Swing, S. R. (2007). The ACGME outcome project: Retrospective and prospective. *Medical Teacher, 29*(7), 648–654. https://doi.org/10.1080/01421590701392903

Tan, X., Liu, X., & Shao, H. (2017). Healthy China 2030: A vision for health care. *Value in Health Regional Issues, 12,* 112-114. https://doi.org/10.1016/j.vhri.2017.04.001

ten Cate, O. (2005). Entrustability of professional activities and competency-based training. *Medical Education, 39*(12), 1176–1177. https://doi.org/10.1111/j.1365-2929.2005.02341.x

ten Cate, O. (2013). Nuts and bolts of entrustable professional activities. *Journal of Graduate Medical Education, 5*(1), 157–158. https://doi.org/10.4300/JGME-D-12-00380.1

ten Cate, O., & Billett, S. (2014). Competency-based medical education: Origins, perspectives, and potentialities. *Medical Education, 48*(3), 325-332. https://doi.org/10.1111/medu.12355

The Lancet. 2019a. Physician burnout: A global crisis. *The Lancet, 394*(10193), 93. https://doi.org/10.1016/S0140-6736(19)31573-9

The Lancet. 2019b. Physician burnout: The need to rehumanise health systems. *The Lancet, 394*(10209), 1591. https://doi.org/10.1016/S0140-6736(19)32669-8

US Department of Health & Human Services. (2017). *Pandemic influenza plan: 2017 update.* Washington, DC: US Dept. of Health & Human Services. Retrieved from: https://www.cdc.gov/flu/pandemic-resources/pdf/pan-flu-report-2017v2.pdf

Van Bavel, J. J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M. J., Crum, A. J., Douglas, K. M., Druckman, J. N., Drury, J., Dube, O., Ellemers, N., Finkel, E. J., Fowler, J. H., Gelfand, M., Han, S., Haslam, S. A., Jetten, J., … Willer, R. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature: Human Behaviour. 4*(5), 460-471. https://doi.org/10.1038/s41562-020-0884-z

Vogt, H., Ulvestad, E., Eriksen, T. E., & Getz, L. (2014). Getting personal: Can systems medicine integrate scientific and humanistic conceptions of the patient? *Journal of Evaluation in Clinical Practice, 20*(6), 942-952. https://doi.org/10.1111/jep.12251

von Bertalanffy, L. (1969). *General systems theory: Foundations, development, applications.* New York, NY: George Braziller.

Vuillermin, D. (2016). Introduction. In D. Vuillermin & L. Guo (Eds.), *Chinese medical humanities review* (pp. 1-8). Beijing, China: Peking University Medical Press. https://www.purpleculture.net/chinese-medical-humanities-review-2016-p-25198/

Wald, H. S. (2015). Professional identity (trans)formation in medical education: Reflection, relationship, resilience. *Academic Medicine: Journal of the Association of American Medical Colleges, 90*(6), 701-706. https://doi.org/10.1097/ACM.0000000000000731

Wald, H. S. (2020). Optimizing resilience and wellbeing for healthcare professions trainees and healthcare professionals during public health crises: Practical tips for an 'integrative resilience' approach. *Medical Teacher, 42*(7), 744-755. https://doi.org/10.1080/0142159X.2020.1768230

Wald, H. S., Anthony, D., Hutchinson, T. A., Liben, S., Smilovitch, M., & Donato, A. A. (2015). Professional identity formation in medical education for humanistic, resilient physicians: Pedagogic strategies for bridging theory to practice. *Academic Medicine: Journal of the Association of American Medical Colleges, 90*(6), 753-760. https://doi.org/10.1097/ACM.0000000000000725

Watts, N., Amann, M., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Berry, H., Bouley, T., Boykoff, M., Byass, P., Cai, W., & Campbell-Lendrum, D. (2018). The 2018 report of the Lancet Countdown on health and climate change: Shaping the health of nations for centuries to come. *The Lancet, 392*(10163), 2479-2514. https://doi.org/10.1016/S0140-6736(18)32594-7

Wei, L., Goez, H., Hillier, T., & Brett-MacLean, P. (2020). A visiting professorship in undergraduate medical education at the University of Alberta: Reflections on possibilities for medical humanities in China, and elsewhere. *MedEDPublish, 9*(190). https://doi.org/10.15694/mep.2020.000190.1

Whitehead, C. R., Kuper, A., Hodges, B., & Ellaway, R. (2015). Conceptual and practical challenges in the assessment of physician competencies. *Medical Teacher, 37*(3), 245-251. https://doi.org/10.3109/0142159X.2014.993599

Woodruff, J. N. (2019). Accounting for complexity in medical education: A model of adaptive behaviour in medicine. *Medical Education, 53*(9), 861-873. https://doi.org/10.1111/medu.13905

World Health Organization (WHO). (2019). Burn-out an 'occupational phenomenon': International Classification of Diseases. Retrieved from: https://www.who.int/mental_health/evidence/burn-out/en

Wu, A., & Noel, G. (2020). How to internationalize medical education using concepts in internationalization of higher education. *MedEDPublish, 9*(151). https://doi.org/10.15694/mep.2020.000151.1

Wu, W., Zhang, Y., Wang, P., Zhang, L., Wang, G., Lei, G., Xiao, Q., Cao, X., Bian, Y., Xie, S., Huang, F., Luo, N., Zhang, J., & Luo, M. (2020). Psychological stress of medical staff during outbreak of COVID-19 and adjustment strategy. *Journal of Medical Virology, 92*(10), 1962-1970. https://doi.org/10.1002/jmv.25914

Wu, Z., & McGoogan, J. M. (2020). Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: Summary of a report of 72,314 cases from the Chinese Center for Disease Control and Prevention. *Journal of the American Medical Association, 323*(13), 1239-1242. https://doi.org/10.1001/jama.2020.2648

Yang, D-Y., Cheng, S-Y., Wang S-Z., Wang J-S., Kuang M., Wang T-H., & Xiao H-P. (2020). Preparedness of medical education in China: Lessons from the COVID-19 outbreak. *Medical Teacher, 42*(7), 787-790. https://doi.org/10.1080/0142159X.2020.1770713

Zheng, Q., Yang, K., Wang, X., Ou, Z., Su, X., Zhang, J., & Qu, M. (2019). Burnout among doctors in China through 2018: A protocol of systematic review and meta-analysis. *Medicine, 98*(37), e17117. https://doi.org/10.1097/MD.0000000000017117

Zwack, J., & Schweitzer, J. (2013). If every fifth physician is affected by burnout, what about the other four? Resilience strategies of experienced physicians. *Academic Medicine: Journal of the Association of American Medical Colleges, 88*(3), 382-389. https://doi.org/10.1097/ACM.0b013e318281696b

ACKNOWLEDGEMENTS

AUTHORS' INFORMATION

Full name: Liying Wei
Institutional affiliation: Associate Professor, Institute of Foreign Languages, Chinese Medical University (Liaoning Province, P.R. China)
Institutional address: China Medical University, No. 77 Puhe Road, Shenyang North New Area, Shenyang, Liaoning Province, P.R. China
Biographical sketch: Liying Wei has completed postgraduate degrees in English Language and Literature. Since 2005, she has been teaching postgraduate listening, translation, and intercultural communication to medical students at Chinese Medical University in Shenyang, Liaoning Province, helping them to prepare for the International English Language Testing System (IELTS) reading test. During the 2019-20 academic year, she was a visiting professor at the Faculty of Medicine & Dentistry at the University of Alberta. Her current scholarly interests include medical humanities, narrative medicine, and intercultural communication.

Full name: Pamela Brett-MacLean
Institutional affiliation: Associate Professor, Department of Psychiatry, Faculty of Medicine & Dentistry, University of Alberta (Canada)
Institutional address: University of Alberta, 116 St & 85 Ave, Edmonton, Alberta, Canada, T6G 2R3
Biographical sketch: Pamela Brett-MacLean is Director of the Arts & Humanities in Health & Medicine (AHHM) in the Faculty of Medicine & Dentistry at the University of Alberta. Early in her career, she completed postgraduate degrees in psychology. She later completed a Ph.D. in Interdisciplinary Studies (Arts & Health) at the University of British Columbia (Vancouver, Canada). In addition to publishing journal articles and book chapters, she has co-edited several texts, including *"Keeping Reflection Fresh"* (2016), *"Art+Medicine Collaborative Practice"* (2019), and *"Social Construction in Action"* (2020). ORCID: https://orcid.org/0000-0001-9090-4174.