Competency-based medical education

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PERSONAL VIEW

Competency-based medical education: The spark to ignite healthcare's escape fire

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ABSTRACT

High-value care is what patients deserve and what healthcare professionals should deliver. However, it is not what happens much of the time. Quality improvement master Dr. Don Berwick argued more than two decades ago that American healthcare needs an *escape fire*, which is a new way of seeing and acting in a crisis situation. While coined in the U.S. context, the analogy applies in other Western healthcare contexts as well. Therefore, in this paper, the authors revisit Berwick's analogy, arguing that medical education can, and should, provide the spark for such an escape fire across the globe. They assert that medical education can achieve this by fully embracing competency-based medical education (CBME) as a way to place medicine's focus on the patient. CBME targets training outcomes that prepare graduates to optimize patient care. The authors use the escape fire analogy to argue that medical educators must drop long-held approaches and tools; treat CBME implementation as an adaptive challenge rather than a technical fix; demand genuine, rich discussions and engagement about the path forward; and, above all, center the patient in all they do.

KEYWORDS

Competency-based medical education; quality care; trainee assessment

Healthcare systems should enhance individual care experiences, improve population health, reduce costs of care, foster healthcare worker well-being, and promote health equity (Berwick et al. 2008; Bodenheimer and Sinsky 2014; Nundy et al. 2022). Such high-value care is what patients deserve and what healthcare professionals should deliver (Porter 2010). However, it is not what happens much of the time (Schneider et al. 2021; Tikkanen and Abrams 2020). And although we recognize this, we nevertheless persist with healthcare that is fragmented, inefficient, inequitable, and expensive (Kohn et al. 1999; Baker 2001).

To achieve high-value care, quality improvement master Dr. Don Berwick has argued that American healthcare needs an *escape fire* that clears a new way of sense-making, leading us from the current state to 'vistas of achievement' that have as yet not been imagined (Berwick 2002). Sadly, his two-decade old plea for an escape fire to save American healthcare from itself fell on deaf ears (Schneider et al. 2021; Tikkanen and Abrams 2020). While the U.S. healthcare system may be most in need of an escape fire, ensuring a timely, high quality, equitable, and affordable healthcare is critical globally (Schneider et al. 2021; Tikkanen and Abrams 2020).

Given the worsening global state of healthcare since Berwick's call, we revisit his analogy in order to argue that medical education can, and should, ignite the spark for such an escape fire. We believe medical education can achieve this by embracing competency-based medical education (CBME), an outcomes-based approach that places medicine's focus firmly on the patient. CBME is often viewed interchangeably with *outcomes*-based medical education (Holmboe and Batalden 2015). This less-used term emphasizes how CBME can address the shortcomings experienced in healthcare, through its focus on ensuring training outcomes that prepare graduates to achieve exemplary patient outcomes.

The first documented escape fire was used by a man named Wag Dodge in the Mann Gulch (a narrow, steep sided ravine in Montana, United States) fire of 1949. Dodge was the foreman for a group of fifteen smokejumpers, a team that parachutes into nature to fight wildfires. Unexpectedly, the Mann Gulch fire jumped from the south side of the gulch to the north, following the planned route of the smokejumpers and cutting off their downhill escape path to the river. The steep incline, heat, poor visibility, and weight of their packs and tools prohibited them from outrunning the fire.

> Forced go uphill rather than down, "Wag Dodge knew they would lose the race to the top. With fire barely two hundred yards behind him, he did a strange and marvelous thing. He

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> invented a solution … he took some matches out of his pocket and set fire to the grass directly in front of him. The fire spread quickly uphill ahead of him and he stepped into the middle of the newly burnt area. He called to his crew to join him as he lay down in the middle of the burnt ground. Dodge had invented what is now called an 'escape fire,' and soon after Mann Gulch it became a standard part of the training of all Forest Service firefighters. But on August 5, 1949, no one followed Wag Dodge … The fire raged past Wag Dodge and overtook the crew." (Berwick 2002)

In the Mann Gulch fire, one individual, placed in a situation of chaos and crisis, improvised a non-traditional solution. His actions were risky and required a leap of faith that could have quite literally led him to jump out of the frying pan and into the fire. This solution was theoretically available to the smokejumpers the whole time, but it took Dodge's ingenuity to envision it and his bravery to step into the unknown. Those not in his escape fire struggled to reach the top of the ridge not only because of the distance and the slope but because they were weighed down by the tools they had been taught never to drop.

Berwick used the escape fire analogy to argue that we are in a gulch: the slope to reach the goal of high value healthcare is too far and too steep given our current approaches. Like the smokejumpers, our vision is hazy and we are weighed down by resistance to change that leaves us clinging to current paradigms. We need an escape fire that allows a new way of sense-making to emerge. This paper proposes that the medical education community ignite an escape fire by fully implementing CBME, which focuses on achieving learner outcomes that, in turn, address population health outcomes. Specifically, we ask:

Can CBME provide an escape fire for healthcare?

Should CBME provide the escape fire for healthcare?

Before addressing these questions, it is important to acknowledge that the escape fire analogy is not a perfect fit for fixing healthcare. Striking a match and throwing it on the ground was a simple solution to a complex problem; implementing CBME to fundamentally change healthcare provision would be an adaptive solution to a complex problem. We explore this, with practical focus on what CBME can do, in greater detail at the end of this article. This distinction notwithstanding, we believe the escape fire analogy provides a useful perspective for several reasons: 1) the focus on urgency for change; 2) the stakes of failing to change; 3) the challenges with seeing and executing new ways of thinking and acting, including willingness to be vulnerable to the possibility of failure; and 4) the focus on primary stakeholders in the urgent challenge facing them.

Why competency-based medical education?

Before we explore 'why CBME?' we must first explain why we believe an escape fire should come from medical education. Modern healthcare rests on three main pillars: patient care (including quality and systems improvement science), research, and medical education (Ludmerer 1999). None of these entities has provided an escape fire to improve healthcare in the two decades since Berwick's call. Any of them could, and they will all need to work together once the spark is ignited. So, why medical education? Our traditional approach to medical education does not guarantee trainees are equipped to meet the needs of patients at graduation (Asch et al. 2009; Chen et al. 2014; Bansal et al. 2016). Rather, it begins with those in the field developing a curricular outline, leading to educational objectives, followed by ways of assessing that those objectives are met (Frenk et al. 2010). The patient is implicitly present in this model at best. However, in our experience, it is more driven by 'wants' of influential faculty rather than 'needs' of patients requiring care.

CBME turns this traditional model on its head by prioritizing patients' needs, defining curricula and assessments based on those needs, and ensuring learners achieve the designated learning outcomes to meet those needs (Frenk et al. 2010). As a result, the advocacy for CBME, which began decades ago (McGaghie et al. 1978), has been embraced by many as a preferred approach to medical education over the past twenty years (ten Cate and Scheele 2007; Frank et al. 2010; Iobst et al. 2010; Ten Cate and Carraccio 2019). At its core, CBME is patient-focused and learner-centered. Given our goal of advocating a better path to providing high-quality healthcare, we will focus more on CBME's promises related to patient-focused outcomes.

Unpacking the escape fire analogy: application to competency-based medical education

Berwick argues that the escape fire analogy applies to healthcare on the whole. We extend this analogy and advocate that the medical education community ignite this escape fire through a full-throated implementation of CBME. Thus, our focus will be on the application of this analogy to medical education and CBME specifically.

To consider how the escape fire analogy can be instructive for medical education as it capitalizes on the promise of CBME, we will consider each 'character' this analogy presents.

The wildfire

In the Mann Gulch fire, flames were spreading at an increasing pace, endangering anything in their path. In medical education, the wildfire is the dysfunctional structure of clinical learning and care that often fails to focus on what patients need – safe, effective, patient-centered, timely, efficient, and equitable care (Baker 2001; Health Affairs 2013; Batalden et al. 2016). The ultimate purpose of medical education is to prepare learners to provide the best possible patient care and outcomes. In order to achieve this, CBME advocates for both patient- and learner-centeredness, with the latter in service to the former in an effort to provide patients the care they need. However, CBME efforts tend to focus more on learners than patients, seeking to ensure safe, theoretically sound, and supportive learning environments (Prideaux and Spencer 2000; Rees and Monrouxe 2010; Laksov et al. 2017; Irby 2018). This focus is understandable. However, it is insufficient, and our experience suggests that it risks treating patients as a backdrop for learner activity (Sebok-Syer et al. 2021). Without a focus on both learners and patients (Holmboe and Batalden 2015; Wong and Holmboe 2016), medical

education will be engulfed by the wildfire of dysfunction that threatens to consume all of healthcare.

The threat

The Mann Gulch fire threatened the smokejumpers' lives. Sadly, dysfunctional systems of medical education also threaten lives. Patients, trainees, and physicians are threatened by the untoward effects of systemic racism, unmitigated bias, pervasive mistreatment of and prevalent burnout in healthcare teams, compressed work paired with unreasonable workload, and myriad other plights (Goiter and Ludmerer 2013; Ofri 2019; Hess et al. 2020; Lucey et al. 2020; Prentice et al. 2020; Nundy et al. 2022). When trainees are positioned to provide suboptimal care through work demands or compromised mental health, they surely suffer. However, the deleterious effects do not end with them – they propagate to patients who can only receive high quality care from providers whose well-being has been nurtured in the clinical learning environment (Bodenheimer and Sinsky 2014).

Partial rather than complete implementation of CBME feigns a focus on patients without prioritizing their care in a meaningful sense. Many regulatory bodies have required a set of competencies for learner development, arguing that achieving them will result in the ability to provide the care that patients need. However, these same organizations neither require nor promote time variability in training that is needed for learners to develop them. We have fixed-time, variable-outcome training rather than fixed-outcome, variable-time. To be sure, there are many logistical problems to time-variable training that require solutions. However, there are also numerous, achievable steps that can be taken to move in this direction (Schumacher et al. 2021). Yet we persist with partial CBME implementation that doesn't realize the vision of outcome-based time-variability and places graduating trainees in unsupervised settings where they are not sufficiently prepared to provide the care patients need and deserve, resulting in threats to both their patients' well-being and their own.

The escape fire

Literally, the term 'escape fire' refers to a patch of grass or forest that is purposefully set aflame to provide a safe area of protection from an approaching wildfire. Conceptually, the term has been extended beyond firefighting to mean an improvisational solution to a complex problem that is impervious to traditional solutions. In this case, we argue CBME could, and should, be the escape fire that improves the quality of healthcare.

Wag Dodge, the smokejumpers, and the resistance

An escape fire for healthcare will be unlikely to come from one individual like Wag Dodge. Rather, it must come from a community with broad influence on the direction of healthcare. Medical education, research, and patient care are the pillars of every modern healthcare system (Ludmerer 1999). While solving current issues will require engagement of stakeholders from all three pillars for transformational changes, an escape fire for healthcare will surely come from the leaders of one of them, subsequently bringing the others onboard. We advocate medical education ignite the flame through a fulsome implementation of CBME. But, efforts to do this are sometimes met with opposition from medical educators who believe a fundamental shift in approach to CBME is unwarranted or without convincing evidence to pursue (Talbot 2004; Whitehead & Kuper, 2017; Boyd et al. 2018; Brydges et al. 2021). In our analogy, such opposition is akin to the smokejumpers in the Mann Gulch fire. To what extent do these concerns arise from loyalty to tradition, fear of change, lack of clarity about the new vision, or exhaustion fighting the fires of working in modern healthcare? Medical education, including CBME implementation efforts, is often poorly supported by institutions, limiting adaptability and solidifying rigidity. This only worsens the exhaustion that comes from working in modern healthcare.

CBME's vision: moving patients into the safety of the escape fire

A wildfire of dysfunctional systems of care and training threaten quality healthcare. However, fear of the unknown leaves many within the medical education community protective of the status quo. An escape fire might feel like defeat, giving up on the ground we are trying to save. We think, 'we can't abandon this system! The implications for patients and learners are too profound.' However, igniting an escape fire that shifts and aligns the primary focus of education and care delivery to patients' experiences and outcomes provides exactly the patient-centered path to redesigning and aligning systems of care and education that is needed.

Implementing CBME is an adaptive challenge that requires finding a spark

Implementing a CBME approach to training is not a technical problem where we can tape new approaches onto our existing dysfunctional system (Heifetz and Laurie 1997; Heifetz and Linsky 2017). Rather, it is an adaptive challenge, one that does not present a clear problem or solution and requires a fundamental change in our approach (Heifetz and Laurie 1997; Heifetz and Linsky 2017). In fact, adaptive challenges can be difficult to identify – and easy to deny. Solving adaptive challenges requires experimentation and new discovery. This work cannot be done by the edict of experts but instead requires investment of stakeholders in addressing the challenges posed by changes in beliefs, roles, relationships, and approaches. Given the characteristics of adaptive challenges (hard work, work to be avoided), it is perhaps not surprising that we treat CBME as a technical problem (limited work, easy fix) in our efforts to implement it.

The value of dissecting an analogy is the clarity that unfolds in examining the places it begins to break down. Full CBME implementation will take years. It is a complex adaptive challenge that will require partnering with regulatory bodies, including policy makers and funders of care, to change traditional processes. In this way, CBME providing an escape fire is not as simple as striking

a match and throwing it on the ground. However, the shift to CBME can start with a spark, a small but critical change. We envision a few key areas of focus to find the requisite spark.

Inspiring an affective shared vision

We need a strong, shared vision that, as Senge notes, is 'a force within people's hearts—a force of impressive power'. (Senge 1990) Our vision centers the patient at the heart of both medical education and health care delivery, thus aligning these two institutions and inspiring members of both communities to be part of 'something bigger'. Working with colleagues to contribute to the realization of a shared vision may provide a respite and offer some resilience in the face of the burnout of so many health care workers in recent years.

Focusing on curriculum rather than just assessment

An earlier attempt to introduce CBME in the late 1970s and early 1980s failed because of the challenges of addressing assessment (Carraccio et al. 2002). This continues to be a barrier. We tend to limit our focus on CBME to a new approach to assessment in medical education rather than also a new approach to defining curricula, namely one that prepares trainees to meet the needs of patients and invokes new ways of learning. However, CBME must begin with a curriculum aiming to achieve desired outcomes, individualize training, focus on knowledge application instead of acquisition, ensure bidirectional teaching and learning between teacher and student, and prioritize longitudinal experiences (Carraccio et al. 2002; Holmboe et al. 2011). CBME then advocates *subsequently* ensuring assessment practices enable tracking development of individuals within that curriculum (Frenk et al. 2010; Schuwirth and van der Vleuten 2020).

Implementing patient-focused assessment approaches

Our attempts to implement CBME also demonstrate our tendency to cling to existing assessment approaches, sometimes holding them in higher esteem than the constructs they represent (Hanson et al. 2013; Whitehead and Kuper 2017). However, in recent years, patient-focused assessment approaches have arisen, including patient reported experience and outcome measures, entrustable professional activities (EPAs), and resident-sensitive quality measures (RSQMs) (Carraccio and Burke 2010; Carraccio et al. 2016; Kingsley and Patel 2017; Schumacher et al. 2018). These consider not only what physicians know and do, the focus of most traditional assessment efforts, but also consider whether or not that knowledge or action constitutes high-quality care for patients. Given recent calls to focus competency-based assessment on what matters for patients (Kogan et al. 2014; Norcini 2017; Ten Cate 2017; Norcini et al. 2018), patient-focused assessment approaches may be an important component of using CBME to ignite the escape fire that thrusts the patient into the center of all we do.

Catalyzing the Medici effect

Finally, adaptive challenges require new ways of seeing and doing. Frans Johansson coined the term 'the Medici effect' to capture the concept that innovation often comes from transferring ideas from one field to another when they work together (Johansson 2004). Other fields, especially those in business and technology, have been leading transformational change and disruptive innovation for decades. Medicine, still dependent on basic assessment software and electronic health records that prioritize billing over patient care, needs to partner with other fields to leverage twenty first century technology solutions that will ensure medical education and healthcare delivery center on patients receiving the high-quality care they need and deserve. Maximizing the benefits of learning analytics and artificial intelligence, including natural language processing and machine learning, will be critical and could serve as a spark from CBME (Lentz et al. 2021; Thoma et al. 2021).

Implementation challenges call for resources, compassion, and collaboration

Perhaps the biggest challenge facing CBME is meaningful implementation as intended. Van Melle and colleagues have published five core components of CBME implementation, which provides a 'North Star'. (Van Melle et al. 2019) However, available time and resources may too often determine implementation success. As a result, implementation successes, such as Education in Pediatrics Across the Continuum (Murray et al. 2019; Hobday et al. 2021) and the experiences of the University of Virginia School of Medicine (Keeley et al. 2022), are balanced by reports such as the 'crushing' 'burden' of CBME assessment efforts (Ott et al. 2022) and the challenges of meaningfully engaging faculty in such efforts (Schumacher et al. 2021). This range of experiences lay bare the need for appropriate resources to ensure high quality medical education programs. However, it also leads us to believe that both compassion and collaboration are foundational to overcoming the implementation challenges that CBME faces. As CBME implementation efforts expand logarithmically, they do so in a world and healthcare milieu that is increasingly despondent, on edge, and even angry. In this milieu, compassion is necessary to demonstrate sincere understanding for barriers that are not personal but rather systemic. This positions those meeting with success to more meaningfully collaborate with those who are not yet.

Cultivating meaningful conversation: the Wag Dodge epilogue

In the years following the Mann Gulch fire, Wag Dodge has been heralded for his ingenuity (Berwick 2002). However, he has also been criticized for his leadership (Willing 2012). Prior to the fire overcoming their area, Dodge had left his crew to scout the fire and eat. His precipitous return, on the run and instructing his crew to drop their tools and bolt, almost certainly confused his crew. They didn't share his knowledge of the fire's fast approach, and he failed to communicate both that knowledge and his sudden decision to light the ground under him on fire and lie down in the burnt area. Ingenuity

saved Dodge's life, but poor communication and lack of credibility may have cost the lives of his crew.

CBME faces the same challenge. It presents both an ingenious solution but also a credibility crisis, being harshly critiqued as 'faith-based medical education' (Whitehead & Kuper, 2017), a 'discourse of infalliability' (Boyd et al. 2018), and a system of 'monkey see, monkey do'. (Talbot 2004) To preserve its credibility in the face of such critiques, the CBME community must continue to share demonstrations of CBME programs' successes and challenges on both institutional and national levels (Lomis et al. 2017; Nousiainen et al. 2018; Murray et al. 2019; Warm et al. 2019; Hall et al. 2020; Holmboe et al. 2020; Amiel et al. 2021; Yamazaki et al. 2022). Communication and credibility challenges loom large for all involved. We cannot afford to make the same leadership gaffes as Wag Dodge, and this paper serves as a call for the CBME community to jumpstart the communication necessary to avoid this.

Conclusion

No one would argue that healthcare is serving patients as it should; nor would they argue that healthcare providers are a healthy lot. And yet here we remain, paralyzed while a dysfunctional care system rages around us. We need an escape fire. Without it, we will continue to shortchange patients and produce learners who do the same (Asch et al. 2009; Chen et al. 2014; Bansal et al. 2016). Medical education can provide the needed spark by creating a shared vision that places a clear, undeniable, and sustained focus on the patient in everything it does through fully embracing and implementing CBME. When we do, as Berwick notes: 'the possibility of invention and opportunity to make sense – new sense – will open not just routes of escape but vistas of achievement that the old order could have never imagined' (Berwick 2002).

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