Change Management and Innovation in Graduate Medical Education

Holly A. Caretta-Weyer, MD, MHPE
Catherine L. Coe, MD
John Patrick T. Co, MD, MPH, MBA
Tonya L. Fancher, MD, MPH
Maya M. Hammoud, MD, MBA
Ami L. DeWaters, MD, MSc

Making meaningful and innovative change in graduate medical education (GME) is often difficult, fraught with roadblocks at multiple levels, requiring a great deal of time and effort, as well as social or political capital. Due to the myriad of challenges to implementing change in GME, ranging from institution-level recalcitrance to systems-level regulatory issues, there is a paucity of pragmatic change implementation frameworks and examples of successful large-scale innovation in the GME literature to guide those hoping to make meaningful and substantive change. We will propose several innovative approaches to large-scale change in the GME space and provide examples of success, obstacles overcome, and lessons learned from a consortium of GME programs and institutions as part of the American Medical Association (AMA) Reimagining Residency initiative.[1] These change initiatives span the transition from medical school to residency, across the entirety of the GME landscape, and into the transition from GME training to unsupervised practice and initial certification.

Projects funded by the AMA Reimagining Residency initiative attempted to address some of the most pressing challenges facing GME in the United States today (TABLE 1). These include addressing the physician shortage in rural and underserved areas,[2,3] improving the implementation of the systems-based practice core competency,[4,5] establishing true competency-based education and assessment,[6,7] and improving the undergraduate medical education (UME) to GME transition.[8-10] Given the complexity, size, systemic structural, and persistent nature of these challenges, it was necessary to explore and utilize a variety of novel change management approaches in order to begin making meaningful long-term change within GME.[11]

Change management is the process of guiding organizational change to fruition, from the earliest stages of conception and preparation, through implementation and, finally, to resolution.[12] There are a number of options for approaching change in GME, each with its own unique uses, benefits, and potential pitfalls. Here, we discuss several potential options (TABLE 2) and provide examples of when they might be of optimal use, considerations for the challenges that each approach may present, and examples of where they have been or might be used from the literature (TABLE 3).

DOI: http://dx.doi.org/10.4300/JGME-D-24-00576.1

Editor's Note: The online supplementary data contains change initiatives from the AMA Reimagining Residency consortium.

Lessons Learned From the AMA Reimagining Residency Consortium

Each of the members of the AMA Reimagining Residency consortium chose to utilize at least one large-scale change management strategy in order to implement their initiatives. Whether these were at the institutional level, across multiple institutions, or across whole specialties, each grantee began with one or several frameworks in mind. The benefits and challenges of each change management framework are discussed here, along with examples directly from the grant projects.

1. Kotter's 8-Step Change Model[13]

The most often utilized approach to change in medical education is Kotter's 8-Step Change Model. This model is tried and true for creating change within a given program. The grant initiatives that employed this model did so given their scale (one across an entire institutional enterprise and the other across an entire specialty) and the myriad of stakeholders needed to buy in (regulatory bodies, licensing bodies, hospital credentialing, national governing bodies, and others; online supplementary data). The Mass General and Brigham Promotion in Place team was successful in getting multiple local specialties with champions to buy in to the guiding coalition. However, challenges emerged with certifying and licensing bodies for multiple willing specialties. The pathology residency program was able to successfully leverage Kotter's model to move forward with promoting residents in place, while others ran up against resistance around the need for change and structural barriers. The Association of Professors of Gynecology and Obstetrics Right Resident,

TABLE 1
Reimagining Residency Grant Projects Included

Project Title	Primary Aim
Competency-Based Education and Assessment in Emergency Medicine	Design and implementation of competency-based education in emergency medicine residency programs
Advancing Systems-Based Practice Implementation	Developing a framework for curricula and assessment of systems-based practice in GME programs
California Oregon Medical Partnership to Address Disparities in Rural Education and Health (COMPADRE)	Addressing rural and tribal physician workforce shortages
University of North Carolina Fully Integrated Readiness for Service Training (UNC FIRST)	Addressing rural and underserved community physician workforce shortages
Mass General Brigham Promotion in Place	Design and implementation of a time variable advancement approach to GME training
Transforming the UME to GME Transition: Right Resident, Right Program, Ready Day One	Easing the transition to residency in OB/GYN by addressing residency selection and preparedness

Abbreviations: GME, graduate medical education; UME, undergraduate medical education; OB/GYN, obstetrics and gynecology.

Right Program, Ready Day One team was highly successful in building a guiding coalition across organizations, uniting around a core strategic vision, and celebrating wins along the way to sustain momentum. In this way, Kotter's framework facilitated an essential model around which to scaffold large-scale change across the entire specialty of obstetrics and gynecology.

2. Readiness for Change Assessment[14,15]

Assessing a GME program's readiness to change prior to initiating a change management process, allows programs with the most readiness to be identified to optimize engagement and chances of success. Doing this emphasized the need to assess readiness prior to beginning any change management project. The Advancing Systems-Based Practice Implementation team identified this as the most essential component of their change process. By identifying programs within the 3 GME systems engaged with their project using this approach, they were able to delineate where to implement their initiative to gain a key foothold and begin to expand more broadly, using successes from programs that were ready, and identifying what within those programs made them fertile ground for successful implementation.

TABLE 2
Definitions and Components of Change Management Approaches

Change Approach	Components of the Change Approach
Kotter's 8-Step Change Model[13]	Employs an 8-step model: (1) Create a sense of urgency; (2) Build a guiding coalition; (3) Form a strategic vision; (4) Enlist a volunteer army; (5) Enable action by removing barriers; (6) Generate short-term wins; (7) Sustain acceleration; and (8) Institute change.
Readiness for Change Assessment[14,15]	Assessment of psychological and structural elements, including resource availability, leadership support, and interest/engagement in the subject that is going to be changed.
Design Thinking[16]	Consists of 5 key steps: (1) Empathize (understand the needs of end users); (2) Define (articulate the problem or challenge that needs to be addressed); (3) Ideate (create potential solutions); (4) Prototype (create experiences or artifacts to elicit feedback from end users); and (5) Test (solicit end user feedback and iterate additional solutions). End users are partners in the entire process.
Implementation Science[17]	A conceptual framework that uses evidence-based approaches to answer key questions around culture, context, climate, finances, and organizational policies that impact the implementation process in order to facilitate successful adoption of an intervention.
Logic Model[18]	A process model that examines priorities, values, resources, mandates, and collaborators and moves to craft inputs and outputs necessary to achieve its intended outcomes while also considering core assumptions, barriers, and external factors that may affect the change process.
Realist Evaluation[19]	Examines what works, for whom, and in what context by looking at corresponding contexts, mechanisms, and outcomes.

TABLE 3
Example Cases of Large-Scale Change Approaches

Change Approach	Optimal Use	Examples
Kotter's 8-Step Change Model[13]	Large-scale change initiatives that require buy-in of a multitude of stakeholders beyond a given program or institution	• Transforming education to effectively respond to trainee well-being needs during COVID-19 by adapting telehealth, tele-education, and ways to stay connected with the program and peers[20] • Transitioning 16 GME programs to a virtual recruitment format while maintaining a high level of applicant engagement, quality of interview experience, and program fill rates[21]
Readiness for Change Assessment[14,15]	Information gathering prior to initiation of any change management work	• Focus groups with physicians and nurses prior to implementing a new initiative called evidence rounds that connects research to clinical care[22] • Developing a questionnaire to address a specialty training's organizational readiness for curriculum change, making it possible for educational leaders to identify and anticipate hurdles in the implementation process and subsequently optimize efforts for successful curriculum change[23]
Design Thinking[16]	Small, focused projects that already have buy-in from necessary partners	• Residents working in teams to address complex well-being issues in the domains of community and connection, space for reflection, peer support, and availability of individualized wellness[24] • Design of an experimental approach toward a GME QI curriculum to promote systems change attitudes among resident trainees[25]
Implementation Science[17]	Complex change processes with micro, meso, and macro stakeholders and evidence of clear large-scale challenges such as policies, organizational mandates, finances, or a culture that would oppose the intended change	• A systematic approach to prepare assessors, faculty, and postgraduate trainees, to complete EPA-based assessments for medical students during the clerkship phase of a new competency-based curriculum by building assessors; skills in direct observation of learners during patient encounters[26] • Introduction of a multidisciplinary pre-rounding meeting in the ICU to establish a continuous quality improvement dashboard designed to reduce continuous benzodiazepine infusion[27]
Logic Model[18]	Initiatives that necessitate organization of multiple components including people, activities, and products toward achieving complex short- and long-term outcomes	• Development of a GME-wide wellness initiative during the COVID-19 pandemic, which revealed an effective resident-led initiative focused on attention to personal health and systematic change as the most important ways to improve resident wellness[28] • A broad change initiative to develop, implement, and disseminate an innovative, comprehensive patient handoff curriculum in pediatric residency training programs across the country[29]
Realist Evaluation[19]	Change management scenarios that require the consideration of context specificity and must be adaptable to different contexts or mechanistic processes	• Examining the implementation of competency-based education including curricular and assessment systems within postgraduate education across Canada[30] • To develop a conceptual framework around a socially accountable learning health system for governments, accreditors, funders, and communities[31]

Abbreviations: GME, graduate medical education; QI, quality improvement; EPA, entrustable professional activity; ICU, intensive care unit.

3. Design Thinking[16]

Design thinking is a human-centered approach to problem-solving that begins with the end user and their needs in mind. Design thinking is known to be advantageous in generating creative solutions to long-standing issues or obstacles by using a "backward design" approach. Backward design begins with the end user's needs and uses the design thinking approach to craft a solution that meets those needs. While design thinking can be highly successful in the right circumstances, not all grant programs found it to be useful due to the time commitment necessary to meaningfully engage in the design thinking efforts. The University of North Carolina Fully Integrated Readiness for Service Training (UNC FIRST) team used it with some success in engaging with stakeholders to create unique solutions to workforce problems in North Carolina. However, they had already established significant buy-in from stakeholders. On the other hand, the Advancing Systems-Based Practice Implementation team found design thinking not to be an effective change management approach within GME for their project due to the lack of time residents and program leadership had to participate in design thinking efforts as end users.

4. Implementation Science[17]

Implementation science provides a conceptual framework to incorporate key informant inputs while using evidence-based approaches to answer key questions that impact the implementation process to facilitate successful adoption of an intervention. By using process cycles that consider internal and external factors that facilitate or challenge the implementation process, one is able to move toward adoption over time by addressing key barriers and bridging inputs and processes. The Competency-Based Medical Education (CBME) in Emergency Medicine project leveraged implementation science to great effect to address a complex change process across multiple programs and move toward whole-specialty adoption of the change. Using implementation science allowed the team to work with their local GME offices and institutions as well as national organizations to anticipate and address challenges around policies and culture that would have otherwise impeded this initiative. While not all challenges could be avoided, early mitigation strategies using an implementation science approach were highly effective.

5. Logic Model[18]

A logic model is an approach to considering a problem or situation, the needs and assets to address that problem or situation, and the key players involved in a way that breaks down the core components and steps required to operationalize a large-scale change initiative or innovation. Both the UNC FIRST and California Oregon Medical Partnership to Address Disparities in Rural Education and Health (COMPA-DRE) teams used a logic model to frame their change management approach to addressing the rural workforce shortage. These programs sought GME and community partners to address the health needs of rural underserved patient populations by training residents within these communities. This required significant organization toward achieving these large-scale change outcomes. Both programs thought that the use of the logic model for their processes was helpful in organizing people and resources toward their ultimate outcome, though it was not sufficient to sustain momentum by itself.

6. Realist Evaluation[19]

Realist evaluation examines the relationships between context, mechanisms, and outcomes. It asks, "What works, for whom, and in what context?" This approach is ideal for innovations and large-scale change that will be applied across different contexts for which there is likely acceptable variability that you want to capture to optimize an adaptable approach to implementation. Both the UNC FIRST and CBME in Emergency Medicine teams utilized a realist evaluation approach within their projects. UNC FIRST employed a great deal of flexibility in deploying their workforce intervention across different systems and therefore desired to examine outcomes and their variability across those systems. The CBME in Emergency Medicine team implemented the core components of CBME variably across pilot sites, examined variability of implementation, and is now using that experience to inform implementation across all emergency medicine training programs, creating even more heterogeneity. While not particularly useful in planning initial change in either instance, realist evaluation as a change framework is essential to drive future scaling of change when substantive context variability can be expected.

While things often did not go exactly according to plan within each project's change process, these approaches provided necessary scaffolding and each grantee was able to affect meaningful change over the course of the funding period. While much work remains to be done, several of the members were able to reflect on their strategies, successes, and lessons learned, available as a TABLE in online supplementary data.

What is clear from these experiences, however, is that no single change management strategy can act

as a "magic bullet." The most successful projects leveraged multiple change management frameworks or were able to pivot to another framework when the first fell short. As such, it is key to examine the change you wish to implement, the context in which you will implement the change, and your current stakeholder buy-in, as well as to ensure that you and your team are prepared to be flexible throughout the process.

Key takeaways from each grant team coalesced around several change management themes. The value of collaboration and frequent communication across stakeholders was the cornerstone of many successes experienced in each project. By leveraging these relationships and involving stakeholders at each step within the given change management framework, each grant team was able to achieve buy-in and work to achieve a scalable innovation. It is imperative to note that celebrating early wins kept stakeholders engaged throughout the process and continued to bolster support. Finally, adaptability throughout the process is key, as large-scale innovation will always involve curveballs. Building teams that can respond by mitigating challenges and pivoting into new directions helps break down barriers and catalyzes continued momentum toward the intended change.

References

1. American Medical Association. AMA Reimagining Residency Initiative. Accessed October 15, 2024. https://www.ama-assn.org/education/changemeded-initiative/ama-reimagining-residency-initiative
2. MacDowell M, Glasser M, Fitts M, Nielsen K, Hunsaker M. A national view of rural health workforce issues in the USA. *Rural Remote Health*. 2010;10(3):1531.
3. Arredondo K, Touchett HN, Khan S, Vincenti M, Watts BV. Current programs and incentives to overcome rural physician shortages in the United States: a narrative review. *J Gen Intern Med*. 2023;38(suppl 3):916-922. doi:10.1007/s11606-023-08122-6
4. Guralnick S, Fondahn E, Amin A, Bittner EA. Systems-based practice: time to finally adopt the orphan competency. *J Grad Med Educ*. 2021;13(suppl 2):96-101. doi:10.4300/JGME-D-20-00839.1
5. Gonzalo JD, Haidet P, Papp KK, et al. Educating for the 21st-century health care system: an interdependent framework of basic, clinical, and systems sciences. *Acad Med*. 2017;92(1):35-39. doi:10.1097/ACM.0000000000000951
6. Frank JR, Karpinski J, Sherbino J, et al. Competence by design: a transformational national model of time-variable competency-based postgraduate medical education. *Perspect Med Educ*. 2024;13(1):201-223. doi:10.5334/pme.1096
7. Lindeman B, Sarosi GA. Competency-based resident education: the United States perspective. *Surgery*. 2020;167(5):777-781. doi:10.1016/j.surg.2019.05.059
8. Jaqua B, Robinson S, Linkugel A, et al. National resident discussions of the transitions in medical education and the UME-GME-CME continuum. *J Grad Med Educ*. 2022;14(6):733-739. doi:10.4300/JGME-D-22-00835.1
9. Swails JL, Angus S, Barone MA, et al. The undergraduate to graduate medical education transition as a systems problem: a root cause analysis. *Acad Med*. 2023;98(2):180-187. doi:10.1097/ACM.0000000000005065
10. Gimpel JR, Swails JL, Bienstock JL, et al. UGRC 2021 recommendations on GME transition: pros and cons, opportunities and limitations. *J Osteopath Med*. 2022;122(9):461-464. doi:10.1515/jom-2021-0285
11. Ludmerer KM. The history of calls for reform in graduate medical education and why we are still waiting for the right kind of change. *Acad Med*. 2012;87(1):34-40. doi:10.1097/ACM.0b013e318238f229
12. Miller K. 5 Critical Steps in The Change Management Process. *Harvard Business School Online*. Published March 19, 2020. Accessed October 5, 2024. https://online.hbs.edu/blog/post/change-management-process
13. Kotter Inc. The 8 steps for leading change. Accessed July 1, 2024. https://www.kotterinc.com/methodology/8-steps/
14. Holt DT, Helfrich CD, Hall CG, Weiner BJ. Are you ready? How health professionals can comprehensively conceptualize readiness for change. *J Gen Intern Med*. 2010;25(suppl 1):50-55. doi:10.1007/s11606-009-1112-8
15. Helfrich CD, Li YF, Sharp ND, Sales AE. Organizational readiness to change assessment (ORCA): development of an instrument based on the Promoting Action on Research in Health Services (PARIHS) framework. *Implement Sci*. 2009;4:38. doi:10.1186/1748-5908-4-38
16. Razzouk R, Shute V. What is design thinking and why is it important? *Rev Educ Res*. 2012;82(3):330-348. doi:10.3102/0034654312457429
17. Carney PA, Crites GE, Miller KH, et al. Building and executing a research agenda toward conducting implementation science in medical education. *Med Educ Online*. 2016;21:32405. doi:10.3402/meo.v21.32405
18. Melle EV. Using a logic model to assist in the planning, implementation, and evaluation of educational programs. *Acad Med*. 2016;91(10):1464. doi:10.1097/ACM.0000000000001282
19. Ellaway RH, Kehoe A, Illing J. Critical realism and realist inquiry in medical education. *Acad Med*. 2020;95(7):984-988. doi:10.1097/ACM.0000000000003232
20. Weiss PG, Li STT. Leading change to address the needs and well-being of trainees during the COVID-19 pandemic. *Acad Pediatr*. 2020;20(6):735-741. doi:10.1016/j.acap.2020.06.001

21. Miles MC, Richardson KM, Wolfe R, et al. Using Kotter's Change Management Framework to redesign departmental GME recruitment. *J Grad Med Educ*. 2023;15(1):98-104. doi:10.4300/JGME-D-22-00191.1
22. Conway A, Dowling M, Devane D. Implementing an initiative promote evidence-informed practice: part 2–healthcare professionals' perspectives of the evidence rounds programme. *BMC Med Educ*. 2019;19(1):75. doi:10.1186/s12909-019-1488-z
23. Bank L, Jippes M, van Luijk S, den Rooyen C, Scherpbier A, Scheele F. Specialty Training's Organizational Readiness for curriculum Change (STORC): development of a questionnaire in a Delphi study. *BMC Med Educ*. 2015;15:127. doi:10.1186/s12909-015-0408-0
24. Thomas LR, Nguyen R, Teherani A, Lucey CR, Harleman E. Designing well-being: using design thinking to engage residents in developing well-being interventions. *Acad Med*. 2020;95(7):1038-1042. doi:10.1097/ACM.0000000000003243
25. Buckley R, Spadaro A, Rosin R, Shea JA, Myers JS. Comparing the effects of design thinking and A3 problem-solving on resident attitudes toward systems change. *J Grad Med Educ*. 2021;13(2):231-239. doi:10.4300/JGME-D-20-00793.1
26. Bray MJ, Bradley EB, Martindale JR, Gusic ME. Implementing systematic faculty development to support an EPA-based program of assessment: strategies, outcomes, and lessons learned. *Teach Learn Med*. 2021;33(4):434-444. doi:10.1080/10401334.2020.1857256
27. Flannery AH, Thompson Bastin ML, Montgomery-Yates A, et al. Multidisciplinary prerounding meeting as a continuous quality improvement tool: leveraging to reduce continuous benzodiazepine use at an academic medical center. *J Intensive Care Med*. 2019;34(9):707-713. doi:10.1177/0885066618769015
28. Seeland GR, Williams BM, Yadav M, et al. Implementation and evaluation of a comprehensive resident wellness curriculum during the COVID-19 pandemic. *J Surg Educ*. 2024;81(3):397-403. doi:10.1016/j.jsurg.2023.11.014
29. Starmer AJ, O'Toole JK, Rosenbluth G, et al. Development, implementation, and dissemination of the I-PASS handoff curriculum: a multisite educational intervention to improve patient handoffs. *Acad Med*. 2014;89(6):876-884. doi:10.1097/ACM.0000000000000264
30. Rachul C, Collins B, Chan MK, Srinivasan G, Hamilton J. Rivalries for attention: insights from a realist evaluation of a postgraduate competency-based medical education implementation in Canada. *BMC Med Educ*. 2022;22(1):583. doi:10.1186/s12909-022-03661-8
31. Wood B, Attema G, Ross B, Cameron E. A conceptual framework to describe and evaluate a socially accountable learning health system: development and application in a northern, rural, and remote setting. *Int J Health Plann Manage*. 2022;37(suppl 1):59-78. doi:10.1002/hpm.3555

Holly A. Caretta-Weyer, MD, MHPE, is a Clinical Associate Professor, Department of Emergency Medicine, and Associate Dean of Admissions and Assessment, Stanford University School of Medicine, Palo Alto, California, USA; **Catherine L. Coe, MD,** is an Associate Professor of Family Medicine and Assistant Dean for Clinical Curriculum, University of North Carolina School of Medicine, Chapel Hill, North Carolina, USA; **John Patrick T. Co, MD, MPH, MBA,** is Vice President of Education, Mass General Brigham, Associate Professor, Department of Pediatrics, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts, USA, and Member, Board of Directors, Accreditation Council for Graduate Medical Education, Chicago, Illinois, USA; **Tonya L. Fancher, MD, MPH,** is a Professor of General Internal Medicine, Vice Chair for Workforce Diversity, and Associate Dean of Workforce Innovation and Education Quality Improvement, University of California Davis School of Medicine, Sacramento, California, USA; **Maya M. Hammoud, MD, MBA,** is a Professor of Obstetrics and Gynecology and Learning Health Sciences, University of Michigan, Ann Arbor, Michigan, USA; and **Ami L. DeWaters, MD, MSc,** is an Associate Professor of Medicine, Penn State College of Medicine, Hershey, Pennsylvania, USA.

Corresponding author: Holly A. Caretta-Weyer, MD, MHPE, Stanford University School of Medicine, Palo Alto, California, USA, hcweyer@stanford.edu, X @holly_cw