From Milestones to Mastery

Building the Data Infrastructure for Competency-Based Medical Education (CBME) That Actually Works

AllofE Solutions

Executive Summary

Competency-based medical education (CBME) is no longer a future-oriented philosophy — it is a present-day mandate. The Accreditation Council for Graduate Medical Education (ACGME) and the American Board of Family Medicine (ABFM) now require residency programs to implement CBME frameworks, and undergraduate medical education bodies are rapidly following. Yet despite broad institutional commitment, most programs find themselves struggling with the same core problem: they have defined their competencies and milestones on paper, but lack the connected data infrastructure to track, assess, and report on student progress in a way that is practical for faculty and defensible to accreditors. This white paper examines why CBME implementation so often stalls at the data layer, what programs are doing to work around the gap, and how integrated curriculum mapping and assessment platforms can close it.

The Challenge: CBME Mandated, Infrastructure Missing

In theory, CBME is straightforward: define the outcomes a learner must demonstrate, create assessment processes that capture evidence of those outcomes, and allow learners to progress when they have demonstrated mastery rather than simply accumulated time. In practice, implementing CBME requires an enormous amount of connected data to flow between systems that were not designed to talk to each other.

A 2025 publication in Academic Medicine described Washington University School of Medicine's multi-year transition to comprehensive CBME — a process that began in 2017 and graduated its first class under the new model in 2024. The authors noted that despite calls for CBME adoption across undergraduate medical education, most programs have only achieved partial implementation: competencies are defined and benchmarks exist, but institutions continue to rely on traditional, course-based assessment methods rather than the programmatic assessment that CBME requires. The gap between stated commitment and operational reality is where most programs are stuck.

For graduate medical education, the stakes are rising. New ACGME requirements for family medicine and other specialties now mandate that programs implement CBME approaches with specific attention to milestones, entrustable professional activities (EPAs), and coaching-based feedback. A 2025 study across eight U.S. emergency medicine residency programs found that

even in specialties with established milestone frameworks, implementing the five core components of CBME — outcomes framework, developmental progression, tailored learning experiences, competency-focused instruction, and programmatic assessment — simultaneously was difficult without a shared data platform to coordinate the effort.

Why This Matters Now

The AAMC's release of its Foundational Competencies framework in 2024, along with new guidance on Core Entrustable Professional Activities for Entering Residency, has renewed accreditor attention to how programs document and demonstrate CBME implementation. Programs that cannot show a clear data trail — from curricular objectives to assessment evidence to learner progression decisions — face increasing scrutiny during self-studies and site visits.

At the same time, the administrative burden of CBME without integrated systems is significant. Faculty must complete more observations and evaluations per student, coordinators must aggregate data from multiple platforms, and program directors must synthesize disparate evidence into coherent milestone reports. Research consistently identifies increased administrative load as one of the top barriers to CBME adoption. When faculty are asked to document competency assessments in systems that are disconnected from where they schedule students, run evaluations, or access curricular objectives, compliance suffers and the data quality that CBME requires evaporates.

Current Approaches and Their Limitations

Most programs attempting CBME implementation are working with a patchwork of tools: a curriculum management system that holds their competency framework, a separate evaluation platform for collecting observer assessments, and a scheduling tool that has no connection to either. Faculty complete evaluations in one system, coordinators export data into spreadsheets, and program directors manually construct milestone reports by synthesizing information from multiple sources. The process is time-consuming, error-prone, and produces a compliance artifact rather than a genuinely useful picture of learner development.

The Acuity Insights analysis of CBME implementation challenges in 2025 identified curriculum alignment — integrating competencies across courses and clinical experiences — as the primary obstacle, followed by the need for an assessment overhaul that moves from high-stakes exams to continuous, formative feedback. Both challenges are fundamentally data

infrastructure problems. Curriculum alignment requires a system that maps each course session, assignment, and clinical experience to the competency framework. Formative assessment requires a platform where faculty can capture brief, structured observations that automatically link to the relevant milestone or EPA — without requiring the assessor to navigate a complex interface.

Programs that have invested in standalone milestone tracking tools report a different limitation: the data lives in isolation. Milestone ratings are collected, but they cannot be cross-referenced with the student's actual clinical schedule, their exam performance, or the formative feedback they received in their LMS. Without this integration, the Clinical Competency Committee making progression decisions is working with incomplete information, and the accreditation self-study requires assembling data from sources that were never designed to connect.

A Better Path Forward: Integration as Infrastructure

The programs that have made the most progress on CBME implementation share a common characteristic: they have invested in a platform that connects curriculum mapping, scheduling, evaluation, and learning management into a single data ecosystem. When a student's clinical schedule in the scheduling module is linked to their competency framework in the curriculum module, and both are connected to the evaluation system that captures preceptor and faculty assessments, the result is a longitudinal, automatically assembled record of each learner's progress toward competency — rather than a manually compiled report produced at accreditation time.

This integration changes what is operationally possible for faculty. Instead of navigating to a separate evaluation platform to complete a milestone assessment, faculty can complete a brief, structured observation immediately after a clinical encounter, with the relevant EPA or milestone automatically pre-populated based on the student's current rotation. The evaluation is linked to the student's record, the competency framework, and the rotation schedule without any additional data entry. Compliance improves because the act of assessment is embedded in the workflow rather than added on top of it.

For program administrators, integrated systems enable the kind of gap and overlap analysis that CBME accreditation reviewers expect. eMedley's eCurriculum module, for instance, allows programs to map each session and clinical experience to their competency framework and then visualize where specific competencies are taught, assessed, and reinforced — and where gaps

exist. Combined with eValuate's evaluation data and eCLAS clinical tracking, program directors can approach accreditation reviews with evidence-based answers rather than retrospective narratives.

Key Takeaways

- CBME is now a regulatory requirement for many graduate medical education programs, not an aspirational model — programs that have defined competencies without the infrastructure to track and report on them are behind schedule.
- The most common implementation failure is not conceptual but operational: programs lack connected systems that link curriculum mapping, scheduling, evaluation, and assessment data into a coherent picture of learner progress.
- Faculty compliance with formative assessment requirements improves dramatically when the act of completing an evaluation is embedded in existing clinical workflows rather than routed to a separate platform.
- Programmatic assessment — the cornerstone of functional CBME — requires longitudinal, multi-source data that can only be assembled efficiently when curriculum, scheduling, and evaluation systems share a common data layer.
- Programs planning accreditation self-studies under CBME frameworks should prioritize building connected data infrastructure now; manually compiled evidence is both resource-intensive and harder to defend under scrutiny.

About eMedley

eMedley, by AllofE Solutions, is the most comprehensive platform for health science education programs, serving medical, nursing, PA, dental, pharmacy, physical therapy, and other programs across the United States. eMedley's integrated suite — including eCurriculum for competency mapping, eValuate for 360° evaluations, eduSched for clinical scheduling, and eCLAS for experience tracking — is designed to support CBME implementation with connected, accreditation-ready data infrastructure. To learn more, visit https://www.emedley.com/ .

References

1. PubMed / Academic Medicine. "Competency-Based Education and Programmatic Assessment in Undergraduate Medical Education: Describing the Gateway Experience of Successful Design and Implementation." November 2025. https://pubmed.ncbi.nlm.nih.gov/40550132/
2. PMC / Journal of Graduate Medical Education (JGME). "Implementing the 5 Core Components of Competency-Based Medical Education in US Emergency Medicine Residency Programs." May 2025. https://pmc.ncbi.nlm.nih.gov/articles/PMC12080492/
3. AAMC. "Competency-Based Medical Education (CBME)." https://www.aamc.org/about-us/mission-areas/medical-education/cbme
4. STFM / Family Medicine. "National Recommendations for Implementation of Competency-Based Medical Education in Family Medicine." April 2025. https://journals.stfm.org/familymedicine/2025/april/tulshian-0414/
5. Acuity Insights. "How To Implement Competency-Based Medical Education (CBME) in Undergraduate Medical Education." May 2025. https://acuityinsights.com/how-to-implement-competency-based-medical-education-in-undergraduate-medical-education/
6. PubMed. "Implementation of competency-based medical education: are we addressing the concerns and challenges?" November 2015. https://pubmed.ncbi.nlm.nih.gov/26494062/