Review Article

Milestones in emergency medicine

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Abstract

Milestones are the most recent development in evaluating resident performance. Each specialty has developed milestones appropriate for the unique specialty. The development of milestones for emergency medicine has been a careful, deliberate and well considered process to better define the work of an emergency physician and the progress of an emergency physician in training.

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1. Introduction

Since 1981, the Accreditation Council for Graduate Medical Education (ACGME) has accredited all allopathic graduate medical education (GME) programs (also known as residency programs) in the USA. Its mission is to improve health care by assessing and advancing the quality of resident physicians’ education through accreditation.1 Educational leaders and experts in each specialty write program requirements. Programs are reviewed and accredited when they are in substantial compliance with these requirements. Many of these requirements began as a consensus on the educational process such as dictating the number of hours of didactic training, the number and types of rotations or experiences and the number of patients seen. In 1999, the ACGME defined six “core competencies” that each residency should teach and assess their resident physicians (Table 1). This initiated a move away from measuring process to measuring educational outcomes, known as the “Outcomes Project”. In response, training programs placed more emphasis on resident evaluation and feedback with new methods and forms, including the standardized direct observation assessment tool,2 counting procedures, and simulations. Many programs merely used a numerical 1 to 9 (poor to outstanding) Likert scale applied to the general headings of the six core competencies without studying validity or reliability. New methods and tools with known reliability and validity for measuring physician competency never fully materialized. The lack of reliability of these assessment instruments meant inconsistent feedback to residents. Standardized assessment methods in which residents and residencies could be reliably compared against each other never materialized.

2. History of milestones at the ACGME

In 2008, the ACGME rolled out a new initiative known as the “Milestones Project” to move closer to measuring outcomes. The expectation of the Milestones Project is that each resident would meet specific competency-based key benchmarks at defined points during his or her development and specifically during the residency training period. The milestones will be customized to provide a developmental roadmap for the competencies and sub-competencies for each individual specialty. As a whole, the milestones of a specialty are behavioral descriptions of the developmental progression of the knowledge, skills and attitudes that define each resident in training.3
Table 1
Six core competencies.

1. **Patient Care** Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Residents are expected to:
   - Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families.
   - Gather essential and accurate information about their patients.
   - Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment.
   - Develop and carry out patient management plans.
   - Counsel and educate patients and their families.
   - Use information technology to support patient care decisions and patient education.
   - Perform competently all medical and invasive procedures considered essential for the area of practice.
   - Provide health care services aimed at preventing health problems or maintaining health.
   - Work with health care professionals, including those from other disciplines, to provide patient-focused care.

2. **Medical Knowledge** Residents must demonstrate knowledge about established and evolving biomedical, clinical, and cognitive (e.g., epidemiological and social-behavioral) sciences and the application of this knowledge to patient care. Residents are expected to:
   - Demonstrate an investigatory and analytic thinking approach to clinical situations.
   - Know and apply the basic and clinically supportive sciences that are appropriate to their discipline.

3. **Practice-Based Learning and Improvement** Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Residents are expected to:
   - Analyze practice experience and perform practice-based improvement activities using a systematic methodology.
   - Locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems.
   - Obtain and use information about their own population of patients and the larger population from which their patients are drawn.
   - Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness.
   - Use information technology to manage information, access on-line medical information; and support their own education.
   - Facilitate the learning of students and other health care professionals.

4. **Interpersonal and Communication Skills** Residents must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients families, and professional associates. Residents are expected to:
   - Create and sustain a therapeutic and ethically sound relationship with patients.
   - Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills.
   - Work effectively with others as a member or leader of a health care team or another professional group.

5. **Professionalism** Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. Residents are expected to:
   - Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supersedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development.
   - Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practice.

   - Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, and disabilities.

6. **Systems-Based Practice** Residents must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. Residents are expected to:
   - Understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice.
   - Know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources.
   - Practice cost-effective health care and resource allocation that does not compromise quality of care.
   - Advocate for quality patient care and assist patients in dealing with system complexities.
   - Know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance.

The milestones can be used by learners, evaluators, residency training programs, and accrediting and certifying organizations. For residents, the milestones are the explicit necessary knowledge, skills and attitudes expected of them and inform them of what would be needed to progress to the next level. For the ACGME, accreditation will be based on a program’s effectiveness to advance the ability and skill of its residents to achieve these milestones as they progress through training. Most importantly, milestones give programs better means to measure and evaluate its residents to assure that they will be competent by graduation.

Medical education is a continuum of learning, from medical school through GME (residency) and then into practice. The GME milestones begin with defining the knowledge, skills, and attitudes expected of a new medical school graduate entering emergency medicine residency training, and include the period beyond training into 3 to 5 years of practice. To maintain uniformity, all specialties, including emergency medicine, define milestones at five levels: Level 1 for the medical school graduate or at the start of the residency training; Level 4 for the residency graduate; and Level 5 for the practicing physician. This format recognizes that some residents may exceed the Level 4 expectation and perform at a higher level by the time of graduation. Because each description of a Level 4 milestone corresponds to a performance expectation of a residency graduate, the compilation of Level 4 descriptors will provide a complete description of expected resident performance at the time they enter independent practice. For emergency medicine, Level 4 corresponds with the initial certification standard of the American Board of Emergency Medicine.

Each specialty has developed its own milestones through working groups, which included input from program directors, residents, and specialty boards, with general guidance from the ACGME in order to to ensure uniformity and consistency of design. All of the major organizations were represented on the Emergency Medicine Working Group.
Emergency physician tasks.

1. Prehospital Care
2. Emergency Stabilization*
3. Focused History and Physical Exam*
4. Modifying Factors
5. Professional and Legal Issues
6. Diagnostic Studies*
7. Diagnosis*
8. Therapeutic Interventions
9. Pharmacotherapy*
10. Observation and Reassessment*
11. Consultation
12. Disposition*
13. Prevention and Education
14. Documentation
15. Multitasking (Task-switching)*
16. Team Management
17. General Approach to Procedures*
18. Procedures: Airway*
19. Procedures: Resuscitation*
20. Procedures: Anesthesia and acute pain*
21. Procedures: Diagnostic and Therapeutic*
22. Procedures: Other Dx and Therapeutic*
23. Contract Principles
24. Financial Issues
25. Operations
26. Clinical Informatics
27. Knowledge Translation
28. Performance Improvement*
29. Systems-based Management*
30. Disaster Management*
31. Communication and Interpersonal Skills
32. Teaching*
33. Research

* 17 essential EM tasks.

The key to measuring milestones accurately for individual residents depends on several important principles: 1) use of standard descriptions of observed behavior so that faculty raters could agree for each resident, which may be viewed as analogous to the Denver Developmental Scale used to measure child development of infants; 2) selection of the descriptors that most closely matches the observed resident performance without reference to PGY level or time in the program; and 3) final determination of milestone level by a group rather than a single individual in order to minimize the effect of biases of a single individual.

3. The development of emergency medicine milestones

Emergency Medicine became recognized as a specialty in 1979 based on the idea that working in the hospital emergency department was a viable and valued practice for physicians. The skill set of emergency physicians was not defined until the American Board of Emergency Medicine (ABEM) described a “Core Content” as a long list of medical conditions that emergency physicians should know how to treat. The depth and expertise needed for each disease was still undefined until this core content was augmented with the acuity of each condition and was matched up with a list of “physician tasks” that emergency physicians should be qualified to perform for each disease. This theoretical matrix, developed by the ABEM along with input from residents, faculty, and representatives from the major emergency medicine organizations, became known as the “Model of the Clinical Practice of Emergency Medicine.” This model and the “physician tasks” were based on the idea that working in the hospital emergency department was a viable and valued practice for physicians. The skill set of emergency physicians was not defined until the American Board of Emergency Medicine (ABEM) described a “Core Content” as a long list of medical conditions that emergency physicians should know how to treat. The depth and expertise needed for each disease was still undefined until this core content was augmented with the acuity of each condition and was matched up with a list of “physician tasks” that emergency physicians should be qualified to perform for each disease. This theoretical matrix, developed by the ABEM along with input from residents, faculty, and representatives from the major emergency medicine organizations, became known as the “Model of the Clinical Practice of Emergency Medicine.”

The Milestone Working Group then defined 24 milestones for the six ACGME core competencies (Table 3). Each milestone has five descriptors for performance at each of the five levels. The 24 milestones include 14 milestones to measure patient care, and one milestone for each of the six ACGME competencies. To the original 14 tasks, another 19 tasks were added for a total of 33 emergency physician tasks (Table 2). To validate the physician tasks, a survey was sent by ABEM to 7000 practicing physicians to define the knowledge, skills and abilities for the tasks they perform. Based on the survey results, the Milestone Working Group selected 17 essential emergency physician tasks to be used to develop the EM milestones.

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skills, and attitudes expected of a graduating resident. Levels 2 and 3 do not necessarily correlate with the training level of a resident because individuals may achieve them at different points in residency. Each level has several descriptors or narratives that describe a certain level of competence that may describe an individual resident behavior. Residents would gradually advance to higher levels with increasing competency.

There are challenges ahead as the specialty implements use of these milestones. Faculty and residents will need to learn how to use these milestones to assess residents. End of shift evaluation, direct observation and simulation will be likely tools used to collect data in order to determine the level of milestone achievement. Programs will need to develop protocols for responding when residents reach or do not reach each milestone. Some individuals may not achieve the expected milestones as quickly as others and decisions will need to be made regarding additional training. Other residents will achieve the milestones early and other decisions will be made regarding early graduation or providing opportunities for advanced studies.

The validity of the milestone approach to resident assessment will also need to be studied as milestones become more widely used. Studies of the effect of the settings where residents are observed, the ability of the milestones to accurately reflect the true performance level of the resident, inter-rater reliability, the cost and the practicality of these measurements should be done. Standard approaches to use and report these milestones will need to be developed. As use of the milestones becomes embedded in GME, it may become apparent that some of the milestone descriptors are set too low and some set too high, and expectations for faculty skills may need adjustment in the future. Despite the unknown aspects of milestones, there is every reason to predict that using milestones as a tool will be an improvement over the current tools in measuring competency.

4. Summary

The promise of the milestones is to give us a better tool to evaluate our residents and to determine when they are ready for independent practice. For faculty, the assessment tools will be more defined and less abstract; for the resident, milestones will be a map enabling them to know what is expected and an early notice if they are falling behind.

Conflict of interest

The authors report no conflict of interest.

References


