



Milestones as a Guide for Academic Career Development

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BACKGROUND AND OBJECTIVES: Faced with a limited supply of applicants for faculty positions, increasing demands for residency faculty, and a growing number of programs, our program has increasingly filled ranks with recent residency graduates with broad scope but limited experience and training in academics. These early-career clinicians often require further mentorship as they seek advancement in clinical skills and development of teaching and scholarly activity skill sets.

METHODS: To educate our recent residency graduates in teaching/scholarly activity skills, and to provide a career trajectory, we created a process to guide their maturation with milestones using the six core competencies from the Accreditation Council for Graduate Medical Education. The milestones consist of four levels of clinician/academic maturation. Each competence has goals and activities for each level of development. We validated the milestones using our physician faculty assessing time spent in academic medicine and academic rank.

RESULTS: Faculty of higher academic rank scored higher in all competencies than faculty of lower academic rank. Correlation between systems-based practice and years in academics demonstrated statistical significance, and all other categories showed nonsignificant associations.

CONCLUSIONS: The milestones are consistent with faculty academic development and career progression, and may serve as a guide for career advancement and as a guideline for professional progression for residency clinicians. Further testing for validation in other family medicine programs is necessary, but preliminary findings indicate this milestone project may be of service to our profession.

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With the increasing number of new medical schools, new family medicine residency programs, and current faculty retirements, there is a need for new physicians possessing broad-based clinical skill sets.¹ A clearly defined career path in academic medicine to

guide new physicians' development is often lacking.

This raises the question of how to develop teaching/scholarly activity skill sets in faculty members. We chose to model professional growth in academic medicine after the educational milestones created to

measure and report the growth of residents as part of the Next GME Accreditation System authored by the Accreditation Council for Graduate Medical Education (ACGME). The milestones the residents reached provided meaningful data on the performance graduates achieved before entering unsupervised practice.²

Academic medicine utilizes milestones for several functions. Shah and colleagues developed a series of educational milestones for surgery residents to evaluate their faculty. The residents reported the milestones were easier, more effective, and objective in evaluating them.³ Garand and colleagues utilized milestones to guide nurses through the promotion and tenure process. The tool prioritized the critical milestones necessary for promotion by offering a time frame to accomplish them.⁴ Srinivasan and colleagues identified six core competencies and four specialized competencies for educators. They adapted skills for medical educators from the physician competencies authored by the ACGME and the roles from the Royal College's Canadian Medical Education Directives. This tool helps educators think about the skill sets and resources needed for success in their

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chosen field.⁵ Görlitz and colleagues created six educational competencies with 57 learning objectives. The model maps faculty development initiatives at different sites within their system. The core competencies for medical educators outlines a profile of requirements for teachers.⁶

Our study sought to assess the ability of our faculty milestone form to guide a faculty member's development. To internally validate its ability to measure growth, all physician members of the department completed the form. Our institutional review board reviewed this study and granted an exception from formal review.

Methods

Our milestones identify four levels of progression in an academic physician's career (Table 1). Under each of the six core competency categories are activities common in an academic physician's job description that may meet this level of accomplishment (Table 2). The ideal first-time faculty member would possess broad generalist skill sets, perform several procedures, and provide hospital care. The level one milestones highlight this proforma, combining

ACGME Milestones levels three and four. Level two faculty milestones feature teaching the level one skills and adding scholarly activity pursuits. The level three faculty milestones feature leadership positions and advanced scholarly activity. Faculty level four milestones target national recognition activities. Faculty members may score at a higher level of milestone on specific competencies as they advance in years of service in academic settings by obtaining more exposure, experience, and the availability of leadership opportunities.

Frequency and descriptive statistics tested the sample by academic rank and years of academic experience. Skewness and kurtosis statistics checked for the statistical assumption of normality for each milestone's distribution. If either statistic was 2.0, then Levene's Test of Equality of Variances tested for homogeneity of variance. When statistical assumptions were violated, nonparametric Kruskal-Wallis tests evaluated for significant effects associated with academic rank across the milestones. We used post hoc pairwise Mann-Whitney *U* tests when a significant main effect was found. We

reported medians and interquartile ranges and interpreted for the non-parametric analyses. We used Spearman's ρ correlation to analyze the associations between years of academic experience and the six milestones.

Results

The statistical assumptions of normality and homogeneity of variance were violated for each milestone outcome, so nonparametric analyses were conducted. Nonsignificant main effects were found between the academic rank groups for all except for systemic practice, for which a significant main effect was detected. Post hoc testing found statistically significant differences between assistant professors and associate professors, assistant professors and professors, but not for associate professors and professors (Table 3). Spearman's ρ correlation found a statistically significant association between systematic practice and years of academic experience, and nonsignificant associations between all other categories (Table 4).

Table 1: Years in Academic Medicine _____ **Current Academic Appointment** _____

	Level 1	Level 2	Level 3	Level 4
Patient care	<ul style="list-style-type: none"> Coordinates care for patients requiring urgent/emergent medical care Apply clinical guidelines in the treatment of patients and facilitates their efforts in managing chronic conditions Use shared decision-making in explaining health promotion and disease prevention recommendations to patients/families Link patients with community resources to achieve health promotion goals Address psychosocial implications on acute and chronic medical problems 	<ul style="list-style-type: none"> Teach learners to coordinate the care of acutely ill patients with consulting services Lead clinical care teams in ambulatory and inpatient settings Teach learners to manage patients with chronic disease and comorbidities Teach learners disease prevention and health promotion Write a case report for publication Learn new procedural/clinical skill 	<ul style="list-style-type: none"> Teach learners through role modeling the integration of the clinical practice with community data to improve population health Expand medical acumen into new arenas filling voids in learners knowledge Expand skills and teach others Present podium presentation/workshop in national or regional venue 	<ul style="list-style-type: none"> Lead patient care teams into rural, mission field, inner city or other settings/activities to improve care for patients lacking access Present a keynote podium presentation or workshop in national or international venue

Table 1, Continued

	Level 1	Level 2	Level 3	Level 4
Medical knowledge	<ul style="list-style-type: none"> • Achieve ABFM board certification 	<ul style="list-style-type: none"> • Maintain ABFM certification • Write a review article for publication or a book chapter • Demonstrate ability to effectively convey medical knowledge to learners • Present a poster at a conference • Present/lead a topic/workshop at a conference 	<ul style="list-style-type: none"> • Develop local practice guidelines • Serve as a reviewer for medical journals 	<ul style="list-style-type: none"> • Author a medical book • Serve as editor of textbook • Participate in national guideline setting panels • Be invited to comment in national press on areas of expertise • Chair a national medical organization • Serve on national educational committee • Direct national meetings or conferences
System-based practice	<ul style="list-style-type: none"> • Analyze personal and systemic causes of medical errors common to family medicine • Partner with patients to increase efficiency and effectiveness in patient care being conscious of resource use and cost in your practice • Use team-based care to provide accountable and coordinated care to meet patient needs • Demonstrate knowledge of billing and the health insurance system and its effect on patients • Participate in a roots cause analysis 	<ul style="list-style-type: none"> • Lead ambulatory and inpatient teams in using resources efficiently and cost conscientiously in complex cases • Serve on a hospital committee • Serve on an academic committee at own facility • Lead a QI project in your program • Lead a roots cause analysis • Teach seamless transitions of care 	<ul style="list-style-type: none"> • Serve as a director of a division (PreDoc, Residency, Research, Clinical) within department • Serve as officer or delegate to local or state professional organization • Serve as chairman of committee within educational system or medical center 	<ul style="list-style-type: none"> • Serve as delegate, officer, or chairman of a national or international organization • Serve as consultant to national or international committees • Serve as chair of an academic department • Serve as a member of clinical/multidisciplinary national committees academically or clinically
Practice-based learning & improvement	<ul style="list-style-type: none"> • Demonstrate critical appraisal of research using set criteria • Analyze personal development as a physician and use a learning plan to advance skills • Initiate quality improvement project in clinical endeavor • Principles of evidence-based care and information mastery are foundation of clinical practice 	<ul style="list-style-type: none"> • Design, perform, and analyze a case-control study • Design/lead a journal club on critical appraisal of medical literature • Manage quality improvement for a clinical entity • Supervise/direct quality improvement initiatives for learners 	<ul style="list-style-type: none"> • Design, perform, and analyze prospective studies (double-blind, controlled) • Create protocols for continuous review of practice procedures and outcomes in department or medical community • Strive through clinical systemic activities to improve the patient experience of care, improve the health of populations, and reduce the cost of health care • Submit and receive funding for a research project • Construct a faculty development curriculum/seminar 	<ul style="list-style-type: none"> • Design, perform, and analyze meta-analyses on medical topics • Maintain R01 or similar sources of grant funding • Manage quality improvement for multiple clinical entities in an organization

Table 1, Continued

	Level 1	Level 2	Level 3	Level 4
Professionalism	<ul style="list-style-type: none"> • Fulfill the professional obligations/responsibilities of a family physician • Model professional personal behavior exhibiting self-awareness, self-management, social awareness and relationship management • Demonstrate value for a patient's beliefs, mores, and cultural practices in shared understanding of patient care plans • Recognize problems and seek to find solutions 	<ul style="list-style-type: none"> • Develop a shared appreciation of learner and work in partnership to meet their personal and professional goals • Demonstrate ability to work effectively with faculty in meeting department/residency/institutional goals • Serve as a mentor for learners 	<ul style="list-style-type: none"> • Demonstrate a high-level of ethics in working with the media, representatives of regulatory bodies, and the government • Demonstrate a high-level of ethics and understanding in professional/personal relationships with colleagues • Serve as mentor for faculty 	<ul style="list-style-type: none"> • Exemplify and role models leadership, scholarship, and professionalism in all aspects of interaction • Receive recognition for outstanding service and dedication in field of practice in national or international arena
Communication	<ul style="list-style-type: none"> • Demonstrate respect for a patient's autonomy in their health decisions • Deliver difficult information regarding personal health issues empathetically and effectively • Use Electronic Health Record in communicating with health care team • Demonstrate effective and ethical use of communication systems • Deliver information to fellow members of the academic community empathetically and effectively using multiple forms of communication 	<ul style="list-style-type: none"> • Build effectively rapport with learners in a clinical environment • Present didactic information in small group and lecture formats demonstrating recognition of learning style of students/residents/clinicians • Demonstrate ability to lead a team in ambulatory or inpatient settings that fosters trust, respect, and understanding 	<ul style="list-style-type: none"> • Work well with difficult learners and develop remediation plans which may accomplish learner and institutional goals • Recognize and utilize the principles of conflict management in difficult situations • Demonstrate success in managing change at the department/institutional level 	<ul style="list-style-type: none"> • Demonstrate leadership in cultural proficiency, understanding of health disparities, and social determinants of health in national/international situations • Excel in conflict management and in de-escalating difficult situations

Table 2: Academic Milestones

Development Criteria	Level 1	Level 2	Level 3	Level 4
Goals for growth	<ul style="list-style-type: none"> • Solidify clinical skill sets • Develop teaching skill sets 	<ul style="list-style-type: none"> • Establish niche in program • Develop skill sets in research/other scholarly activities 	<ul style="list-style-type: none"> • Hone leadership skills 	<ul style="list-style-type: none"> • Network/influence • Clinical medicine • Academic medicine
Academic rank	Assistant professor	Assistant/early associate professor	Associate professor/early professor	Professor
Time devoted to academics (years)	1-3	4-7	8-15+	16+

Table 3: Descriptive Statistics for Kruskal-Wallis Tests

Milestone	Assistant Professor*	Associate Professor*	Professor*	P Value
Patient care	3.0 (0.0)	3.5 (1.0)	3.0 (0.8)	.37
Medical knowledge	2.0 (0.0)	3.0 (0.8)	2.5 (1.0)	.57
Systematic practice	2.0 (0.0)	2.0 (0.0)	3.0 (0.8)	.01
Practice/learn/improve	2.0 (0.0)	3.0 (1.5)	1.0 (1.5)	.30
Professionalism	2.0 (0.0)	3.5 (1.0)	3.5 (1.0)	.42
Communication	2.0 (0.0)	3.5 (1.0)	3.5 (1.0)	.09

* Values are median (interquartile range).

** $P < .05$.

Table 4: Spearman Correlations Between Milestones and Years of Experience

Milestone	Correlation With Years of Academic Experience
Patient care	0.39
Medical knowledge	0.29
Systematic practice	0.86*
Practice/learn/improve	-0.59
Professionalism	0.35
Communication	0.48

* $P < 0.05$.

Discussion

This academic milestone form effectively describes our department's strengths and weaknesses along with anticipated development trends in the other competencies. This department's footprint maintains high inpatient and outpatient profile, which is consistent with faculty scoring higher in patient care, professionalism, and communication categories across years in academic medicine and academic rank categories. The accelerated performance of assistant and associate professors in medical knowledge and practice improvement is likely related to six of the seven faculty in these ranks having completed academic fellowships compared to 59% for full professors (Table 5).

This department's profile is likely unique to programs with similar academic/clinical environments. A program's profile would differ by the health care system's emphasis on clinical, teaching or research pursuits and whether they reside on a medical school campus, or are a stand-alone community residency.

The limitations of this study limit generalizability. The total number of faculty evaluated was small. Further, all participants were located at the same site, and each author participated.

Our milestones provide a matrix whereby academic programs can guide professional development. These guidelines are not intended as a checklist for academic promotion or as a framework for evaluations.

They are not intended to bring about punitive measures, but offer insight on career trajectory. Based on personal characteristics and skills, physicians gravitate toward the levels of their interest and expertise. For this reason, these guidelines should not function as a plumb line to evaluate individual success or serve to define a productive academic career.

The Milestones Form should be tested in other family medicine programs to determine generalizability, its ability to define strengths/weaknesses, and gauge faculty members' development. If these are realized the form could guide faculty selection, enhance faculty member's strengths while minimizing weaknesses, and nurture the development of faculty within departments.

Table 5: Department of Family Medicine

Demographics			
	Assistant Professor	Associate Professor	Professor
Age (years)	31, 34, 37	48, 50, 61, 66	49, 65, 67, 69
Gender			
Male	2	3	3
Female	1	1	1
Academic fellowship	3	3	2
Publications	5	9	5
Presentations (regional, national)	8	4	8
Clinical Practice			
University family physicians University occupational medicine service University family physicians inpatient service University sports medicine clinic Wound care clinic			
Academic Programs			
	Learners/Year		
Family medicine residency program	8-8-8		
Sports medicine fellowship	1		
Emergency medicine fellowship	2		
M3 clerkship	18		
M4 elective	9		
Sports medicine M4 elective (new)			

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