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71 Proposed Emergency Medicine Ultrasound Fellowship Milestones

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Introduction/Background: Ultrasound (US) is a skill integral to the practice of emergency medicine (EM). Emergency US fellowship programs train future leaders and develop the necessary skills to successfully lead an US program. Currently, no standardized evaluation tool exists for US fellows, and there is wide variability among programs.

Educational Objectives: We propose a milestone-based system to assess fellow competencies. We describe a graduated approach for the key knowledge, skills, abilities, attitudes, and experiences for US fellows.

Curricular Objectives: The milestones include Clinical Ultrasonography, Education and Teaching, Administrative Leadership, Research and Scientific Discovery, and Advocacy (Image 1). The milestones and individual components were developed using published ACEP US fellowship guidelines and expert consensus opinion. The milestones utilize the same 5 level approach as the ACGME-ABEM EM Milestones. Level 1 represents expectations of an incoming fellow, Levels 2 and 3 represent progression through fellowship training, Level 4 corresponds with a graduating fellow, and Level 5 is that of an advanced practitioner. No specific resources are required for implementation, and milestones can be incorporated into monthly and quarterly fellow evaluations. The milestones also offer a structured longitudinal support to the fellowship curriculum.

Impact/Effectiveness: Milestones would allow a standardized approach, ensure quality training across programs, and reduce variability. Fellows would receive well rounded training and gain experience essential to becoming an effective leader. We plan to study and validate these milestones.

Milestone 1

Clinical Ultrasonography

Develops clinical competency in ultrasound image acquisition, interpretation, and integration in the care of emergency patients for the full range of point-of-care US applications

Level 1	Level 2	Level 3	Level 4	Level 5
<p>Graduates from ACGME or AQA accredited EM residency</p> <p>Exceeds > 150 core US (level 4 EM milestone PC12)</p> <p>Meets 2008 ACEP Emergency US guidelines for ultrasound credentialing</p> <p>Understands basic US physics</p>	<p>Learns advanced ultrasound physics, including Doppler</p> <p>Expands US skills to include advanced applications as delineated in the CORH-AEUS consensus document</p>	<p>Optimizes US images in all circumstances, including technically challenging patients</p> <p>Understands pitfalls/limitations of US and alternative diagnostic and treatment strategies</p> <p>Correctly interprets and integrates US findings into patient care in a wide range of clinical scenarios</p>	<p>Performs a minimum of 1000 US in both core and advanced US applications</p> <p>Meets graduation criteria from 2010 ACEP Emergency Ultrasound Fellowship Guidelines information paper</p>	<p>Develops new point-of-care US applications</p> <p>Develops US protocols for ED and other departments across an institution</p> <p>Develops US guidelines for national organizations</p>

Suggested Evaluation Methods: Direct observation in clinical practice, Quality assurance review, Simulation, OSCE, SDOT, written examination, US case log
Competencies evaluated: PC, MK, PBLI, ICS, Prof, SBP

Milestone 2

Education and Teaching

Develops educational skills to effectively teach and transfer knowledge to learners

Level 1	Level 2	Level 3	Level 4	Level 5
<p>Understands different learning styles and differences important to adult learners</p> <p>Identifies learner's needs through structured evaluation</p>	<p>Employs effective teaching strategies</p> <p>Develops US educational materials, such as lectures, handouts, books, blogs, videos, websites</p> <p>Helps run hands-on labs and small group sessions</p> <p>Improves bedside teaching and presentation skills</p> <p>Participates in an US educational rotation for residents</p>	<p>Matches appropriate educational strategies with learner's needs</p> <p>Uses alternative strategies to traditional didactics, such as social media and web-based resources</p> <p>Participates in competency evaluation of learners, including OSCEs and SDOTs</p> <p>Coordinates US educational activities for medical students, residents, and attending physicians</p>	<p>Completes fellowship educational project</p> <p>Gives at least 4 lectures on core and advanced US topics</p> <p>Independently runs hands-on labs for core and advanced US topics</p>	<p>Develops educational curriculum for training medical students, residents, fellows, and attending physicians</p> <p>Coordinates US training across departments of an institution</p> <p>Participates in the development of educational guidelines for national organizations</p>

Suggested Evaluation Methods: Direct observation in teaching, Review of educational materials, Review of US teaching portfolio, Written exam, Observation and evaluation of learners
Competencies evaluated: PC, MK, PBLI, ICS, Prof, SBP

Milestone 3

Administrative Leadership

Develops administrative leadership skills in order to independently run an US program

Level 1	Level 2	Level 3	Level 4	Level 5
<p>Understands role of quality assurance (QA) and improvement (QI) in running an US program</p>	<p>Participates in ongoing QA of submitted US studies</p> <p>Involved in credentialing of new US users during the training process</p> <p>Stocks necessary US supplies (gel, transducer covers)</p>	<p>Coordinates image archival and storage</p> <p>Maintains US equipment and handles necessary service calls</p> <p>Participates in interdepartmental meetings regarding point-of-care US</p> <p>Involved in US billing, report generation, and billing audits</p> <p>Generates and provides feedback of reviewed QA studies</p>	<p>Completes fellowship administrative or QI project</p> <p>Coordinates QA/QI program for ED US program</p> <p>Participate in EUS financial program (budget and proposals for equipment purchase)</p>	<p>Coordinates QA/QI across departments of an institution</p> <p>Develops QA/QI and accreditation guidelines for national organizations</p>

Suggested Evaluation Methods: Direct observation, Review of QA/QI studies performed, Review of feedback, Tracking revenue from billed studies
Competencies evaluated: PBLI, ICS, Prof, SBP

Milestone 4

Research and Scientific Discovery

Develops research and scientific discovery skills to forward the scientific basis of point-of-care US

Level 1	Level 2	Level 3	Level 4	Level 5
<p>Becomes familiar with current US literature</p>	<p>Develops and formulates fellowship research question and project</p> <p>Prepares and submits fellowship project to IRB</p> <p>Participates in ongoing US research projects</p> <p>Participates in journal club and literature reviews</p>	<p>Collects and analyzes data for fellowship research project</p> <p>Presents research findings at a regional or national conference</p> <p>Critically appraises scientific literature regarding point-of-care US and develops best evidence practices</p>	<p>Completes fellowship research project</p> <p>Submits and publishes completed research manuscript</p>	<p>Obtains funding for research projects</p> <p>Coordinates multi-center US research projects</p> <p>Serves as a peer reviewer</p> <p>Serves as an editor for scientific journal</p> <p>Participates in advanced research training courses</p>

Suggested Evaluation Methods: Direct observation, Mentoring, Review of research project, Journal club
Competencies evaluated: PC, MK, PBLI, ICS, Prof, SBP

Milestone 5

Advocacy

Participates in advocacy to promote point-of-care US in institution and through national organizations

Level 1	Level 2	Level 3	Level 4	Level 5
<p>Becomes familiar with history and future directions of point-of-care US</p> <p>Understands scope of practice of point-of-care US</p>	<p>Understands issues and policies regarding point-of-care US</p>	<p>Participates in interdepartmental committees in institution regarding US</p>	<p>Participates in interdepartmental committees in institution regarding US</p> <p>Involved in promotion of point-of-care US within institution</p>	<p>Chairs US section or department within an institution</p> <p>Actively participates in a national organization US committee</p> <p>Participates in developing US policies by national organizations</p>

Suggested Evaluation Methods: Direct observation, Review of activities, Departmental meeting minutes
Competencies evaluated: PC, MK, PBLI, ICS, Prof, SBP

Figure 1. Proposed emergency medicine ultrasound fellowship milestones.